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पुस्तकालय



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JOURNAL OF THE TRANSACTIONS

OF

THE VICTORIA INSTITUTE.

VOL. IV.

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JOURNAL OF

THE TRANSACTIONS

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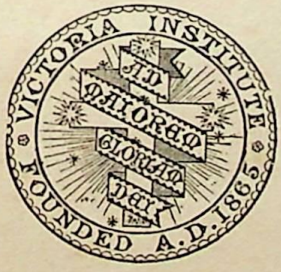
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OR

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EDITED BY THE HONORARY SECRETARY.

VOL. IV.



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Objects of the Victoria Institute.

First.—To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture, with the view of defending these truths against the oppositions of Science falsely so called.

Second.—To associate together men of Science and authors who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association; and by bringing together the results of such labours, after full discussion, in the printed Transactions of an Institution, to give greater force and influence to proofs and arguments which might be regarded as comparatively weak and valueless, or be little known, if put forward merely by individuals.

Third.—To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which Science is now divided, in order to get rid of contradictions and conflicting hypotheses and thus promote the real advancement of true Science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, who in His wisdom created all things very good.

Fourth.—To publish Papers read before the Society in furtherance of the above objects, along with *verbatim* reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute.

Fifth.—When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, to which ladies will be admissible; and to publish such Lectures.

Sixth.—To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real science, and generally in furtherance of the objects of this Society.

Seventh.—To found a Library and Reading Rooms for the use of the Members and Associates of the Institute, combining the principal advantages of a Literary Club.

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Terms of Membership, &c.

The Objects of the Victoria Institute being of the highest importance both to Science and Religion, while they are such as have not been attempted to be attained by any previously existing scientific society, it is anticipated that when its establishment is known, it will receive the most liberal support by gifts and donations from friends, and be joined by large numbers of Members and Associates.

The annual subscription for Members is now Two Guineas each ; with One Guinea Entrance Donation.

The annual subscription of 1st and 2nd class Associates (ladies being eligible) is Two Guineas, or One Guinea each, without any Entrance Fee.

Life Members to pay Twenty Guineas ; and Life Associates, first or second class, to pay Twenty or Ten Guineas, respectively, in lieu of the above Annual Subscriptions.

Vice-Patrons (ladies or gentlemen) to pay not less than Sixty Guineas each, as a Donation to the funds of the Institute.

*** All who join the Society as *Members* must be professedly Christians.

On 31st December, 1866, the Foundation Lists were closed. *Members* now admitted will be required to pay an Entrance Donation of One Guinea, as above stated ; but they will receive the first volume of the Journal of Transactions *gratis*. Members and Associates are entitled to the Journal commencing with the year for which their first subscription is paid ; and the charge to them for earlier numbers is half-a-crown each.

Further particulars will be furnished upon application at the Office, 8, Adelphi Terrace, Strand, London, W.C.

*** *All Applications for admission and general correspondence (as to papers proposed to be read, &c.) should be addressed to the Honorary Secretary of the Institute, and all remittances of Donations or Subscriptions to the Honorary Treasurer, at the Office, 8, Adelphi Terrace, Strand, London, W.C.*

Cheques to be crossed to Messrs. Ransom, Bouverie, & Co., Bankers, 1, Pall Mall East, London, S.W.

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PREFACE.

I HAVE once more the satisfaction of congratulating the Vice-Patrons, Members and Associates of the VICTORIA INSTITUTE on the completion of another volume of our *Journal of Transactions*, and the commencement of Volume V. Considering that the Society was only founded in 1865, and not organized till 1866, when our Ordinary Meetings began and our first Papers were read and discussed, I venture to say that the amount of printed matter we have already published is unprecedented in the history of scientific societies. I may also as confidently appeal to the quality as to the quantity of what we have published as a source of very great satisfaction.

It could scarcely be expected that all our later papers should have as much novelty or interest as some of those with which we commenced our proceedings. But we are bound to take up the most sombre questions, when their consideration is of consequence, as affecting directly or indirectly the truths of revelation. We must rather, therefore, measure our success by the soundness of our reasoning, and the importance of our discussions, than by their liveliness; though, as a rule, I think I may add, our discussions have never been dull.

None of the other Authors of Essays which appear in this Volume will, I feel very sure, consider that any injustice is done to them, if I here venture to call special attention to the great value of the three papers "On Human Responsibility," contributed to the present volume by the Rev. Prebendary

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Irons, D.D., the Bampton Lecturer of this year. In accordance with the wish of Dr. Irons, the Council authorized the separate issue of these papers by themselves, before the discussions upon them were in type. This had the advantage of securing their earlier and complete publication as a continuous Essay; but still, I think our Members generally will be none the less glad to see those papers as they now appear, with the discussions upon each as it was read. It is true that upon those occasions there was not so much difference of opinion as when some other papers have been read; but the unanimity then exhibited is a most gratifying evidence of the essential unity of professing Christians, although belonging outwardly to different denominations or schools of thought, as regards the most important fundamental principles. The Victoria Institute was, in truth, founded in confidence that there does indeed exist this "unity of spirit" amongst us, notwithstanding all our outward differences. It was an endeavour to get Christians to combine in defence of the truth of revelation against enemies who are confederate together, and are as it were in league against it. And we can now appeal to four volumes of more than 400 pages each, in proof of our success, and also of the freedom and fairness of our discussions, albeit we are united with a common object in view. There has been none of that stagnant uniformity of opinion which some persons dreaded would characterise our proceedings, and render discussion almost impossible; and it should be kept in mind, that the fulness of the reports of our discussions, which is one of the distinctive features of the Institute, enables the Council to accept of papers with the conclusions of which they may not in the least agree, mainly in order that they may be fully, fairly and openly criticised. Men who are in earnest will never shrink from having their opinions subjected to such an ordeal; for truth has nothing to fear; while false views are likely to be most pernicious when "preached" about among the people, in lectures at which free discussion is either not allowed or not recorded; or when they are disseminated by means of attractive volumes by popular authors, in the form

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of "lay sermons," in which everything in the name of science is delivered, as it were, *ex cathedrâ*, and, to use Lord Bacon's phrase, in "the professorial style."

Our *Journal of Transactions* is already a valuable repertory of numerous heterogeneous notions in science and philosophy, which have been advanced from time to time as more or less inconsistent with preceding beliefs in what is revealed, or supposed to be revealed, in Holy Scripture; but in our *Journal* all such notions have also, in juxtaposition, arguments and proofs upon the other side—bane and antidote are found together—or misunderstandings and imaginary difficulties are cleared away; while in many instances it has been shown, that so-called science has been mainly in opposition to itself, and, although professing to be the standard of truth, has been constantly shifting its ground, and giving forth the most uncertain sounds as the teaching of that true science to which all are bound to submit. It will thus be seen how successfully the Institute is carrying out the Objects for which it was founded; and, in conclusion, I beg leave to add, that I am not aware of a single objection of any consequence, which has been urged in the name of science or philosophy against the teaching of Scripture in our day, that has not been fairly considered and disposed of, either to some extent or thoroughly, at the meetings of the Victoria Institute.

J. REDDIE, *Hon. Sec.*

31st December, 1870.

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JOURNAL OF THE TRANSACTIONS

OF THE

VICTORIA INSTITUTE,

OR

PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

ORDINARY MEETING, February 1, 1869.

The Rev. Walter Mitchell, M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Secretary announced the election of the following :—

Member :—J. Lindsay, Esq., Merchant, Whitefield, Belfast.

Associate 2nd Class :—F. Brotherton, Esq., 4, Royal Exchange Avenue, and Tulse Hill, Surrey.

The Chairman then called upon the Rev. Dr. Irons to read the paper that follows.

Dr. Irons.—A word of apology is due for bringing before you a subject so abstruse, and so different from the ordinary subjects considered in this place ; but whoever knows anything of the state of things in London, and also in the country, among the more energetic of the slightly educated classes, will quite understand that the time has come when it is impossible to go on with a sort of assumed truce between Christianity and morals ; because, undoubtedly, at the present time there is a prevailing notion among the classes to which I have referred, that there is a difference between the morality of religion and that which belongs to human nature as such. And this is doing us far more harm than any of the attacks on the externals of Christianity. Our historical position, and the theory of religion at large, are indeed assailed, but the harm done by that assault is as nothing compared with that internal disbelief which I know to be prevalent as to the moral essence of our faith. (Hear, hear.) That must be my apology for bringing

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before you a subject of very barren interest, it may appear; yet surely it will be found a most fruitful inquiry, though a very difficult one. I must ask you, therefore, to bear in mind that the present is only preliminary to that more historical examination to which I hope to bring you in a succeeding paper, leading subsequently to the adoption of the doctrines of Christianity, and all the truths of revelation. With these remarks, and asking for your forbearance on this occasion, I will proceed to read what I have written :—

ANALYSIS OF HUMAN RESPONSIBILITY. (Part First.)

By the Rev. William J. Irons, D.D., *Prebendary of St. Paul's; Vicar of Brompton, Middlesex; Mem. Vict. Inst.*

CONSPECTUS.

I. Introduction (§ 1–7).

II. What *ought to be* is based on *what is*—(in the widest sense).
The idea of *Ought* recognizes a distinction of Persons and Things.
"Person" involves Accountability,—as a *fact.*
Difficulties of the fact of Accountability: [1] Its actual beginnings. [2] Varieties *ab initio.* [3] More advanced stages. [4] Import of Habit. [5] Qualified accountability. [6] Religious influences. [7] Result. (§ 8–12).

III. Accountability may always imply *approbation* or *disapprobation;* and in approbation and disapprobation, *right* and *wrong* are implied.
Right is the relation of approbation to some *Good;*
both the "good *in itself,*" and "good *in the doer* of it."
"Good in the doer," or Agent, implies some *freedom.*
Freedom *cannot be unlimited,* in agency.
Limits may be *exterior* to the agent; or *interior.*
These limits differentiate the agency.
An agent, limited by exterior compulsion, and one who is not so limited, } not *alike* accountable.
(§ 13–19).

IV. What further do we mean by a conscious agent, or Person?
Approbation, and praise,—and the opposite,—imply contingency.
A conscious Agent exists at a point *between the not being and the being of an act.*
The *anterior possibility* of an act's not being, or being, is Contingency; and this is *assumed* in agency which is held accountable.
Denial of this *anterior possibility* changes the idea of accountability.

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The whole issue here raised: whether the conscious agent *determines* of himself. (The denial of which makes the conscious agent to be *only passive*.)

All the facts affirm the reality of the *internal self-decision:* and that this *self-decision* is not from internal *necessity* (which would involve a contradiction).

Contingency, as involved in conscious agency, *an axiom* of social life.

The conscious agent, praised or blamed, in fact, so far as he is a *determiner of action.* (§ 20–26).

V. Not, however, for determining simply, or any how; but in reference to *right.* The "accountability" is for the determination (which *ought* to be Right).

The *inner character* of an act, as right or good: in relation to the agent.

The conscious agent comprises *a duality.* (The Thinker and the Thought distinguished.)

The Thinker stands in relation to the *phenomenal:* but also to the "*true-always.*"

This *latter relation* touches the *beginning* of "good," *per se.*

In reference to "the good," the *sameness* of conscious agency is a fact.

The conscious agent is *not the measure* of the absolute; nor yet of the phenomenal: though he is in relation with both; the former being prior to an external law. (§ 27–32).

VI. Extension of the analysis.—Responsibility, *in the social system.*

Various kinds of responsibility distinguished. (Examples.)

Distinction of the *purely Moral* responsibility.

Mutual relations of responsible agents.

The adjustment of *relations*, often *inscrutable*, between man and man.

Yet man exists in, and for *society.*

External and internal *government*—how related.

The best government, *ideally.*

The best *de facto*, not the same everywhere. (§ 33–40).

VII. How some difficulties are met, in the pre-Christian philosophies; by merging the right in the useful.

How met in modern civilization, and law;

by imperfect approximations to a moral ideal; (chiefly by utilization of the Religious convictions).

The fact recognized, that Religion is more than mere policy.

Whatever more it be, is *contributed by the Individual.*

The meaning of saying that a "*State has a conscience.*"

The meaning of *Hobbesism:* and that it involves a contradiction.

Erastian modification of Hobbesism equally a contradiction. (§ 41–46).

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VIII. Embarrassing position of conclusions at this point.
The need of a Supreme Governing Power if there be finite Responsible agency.
The only alternative, a denial of facts.
The Individual responsible agent has a sense of a Higher Rule.
Pantheism does not satisfy this.
The Character of the Supreme GOVERNOR must be known.
(§ 47-51).

I.

Introduction.

1. WE are said to be in the midst of a great revolution of opinion. Old thoughts and traditions as to religion, philosophy, and social economy are submitted to new examinations. Watchwords which once rallied men to inherited creeds and systems have lost their power. Prejudices, which (with the many) act as the practical substitutes for wisdom and virtue, are widely disturbed. The general standard of intelligence and education still is low, and the "fearful and unbelieving" are alarmed. But the alarm is useless; for facts must be met. The transition from the state of prejudice to that of principle is always trying, whether for the individual or the community; but it cannot be ultimately avoided, nor in our case even postponed. The challenge to free thought is so broadly scattered that it will certainly be accepted by multitudes who, qualified or not, will influence the future of Christendom. The guardians of the ethics and philosophy hitherto deemed sacred, if they have confidence in them as true, must show it now.

The Present Philosophy.

2. That mixed practical philosophy which meets us, in various forms on every hand, may in England be described as an irregular compound of fact, experience, and influence; and it is becoming familiarly known, even here, as "Positivism." M. Comte and his followers regard Positivism as a discovery, but as far as the obvious principle is concerned, such a pretence is without foundation; because facts must always have been the basis of science. Aristotle was as truly an inductive philosopher as Bacon, and Bacon as much as Comte. The eliciting of principles and ascertainment of laws may be subsequent to induction, but cannot alter the subject-matter. If any of us complain of the Positivism of the present hour, it is not for its appeal to facts; it is because of its not examining the whole field.

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3. In a work entitled "On Final Causes," published more than thirty years ago with some foresight of an approaching disruption of opinion, one postulate was thought sufficient, viz., "that the facts of Human Nature be taken as the grounds for a science of Human Nature." We ask no more in the present inquiry. None can disallow this without saying that all experience is delusive, and that all consciousness is false. Logicians, mathematicians, and moralists can have no real dissension here. For every honest mind delights to deal with facts; nor is there a worse sign in any class, or any generation, than a disinclination to reality, and to that painstaking which it demands. If any are for reconstructing the social system of our times, we say in the name of common uprightness, let it not be on the basis of some poor compromise between facts and principles. The attempt would but show intellectual feebleness, and a moral scepticism vainly reactionary. Let us examine the facts of human existence and reflect on their meaning.

Challenged on its own alleged foundation, viz., Fact.

There are in some crises of nations attempts at reaction which simply indicate the worst signs of civilization in extremity. As an ancient example of this we might point to the reassertion of heathenism under the Emperor Julian; and as a modern instance to Pius IX.'s revival of Ultramontanism. Let us hope better for our country than any such collision with facts. The dream of a *status quo antè* would possibly betray a fatal symptom of the last throes of a worn-out social system.

Evasion to be deprecated:

4. Even Positivism has its hopeful aspect, if we may take it to imply that the world is not to go on merely scoffing at "dogma," or simply smiling at "metaphysics." Too long it has been content to accept certain results in ethics and polity while discrediting the theories implied. It is nobler, at least, to aspire to a philosophy of its own; and this may effectually bring us into close quarters in the battle for truth and right.

For to go on without a philosophy is to build without a foundation. And more than this: if it be done long and deliberately, it is practically to dispense with conscience—a danger by no means remote. To form an opinion, or to take a side, without feeling bound to the utmost of our power to form the right opinion and take the right side, (as if to know right and be right were unimportant or indifferent), must be demoralizing. Self-respect alone should oblige the hope, if not the conviction, that we have not committed ourselves deliberately or wantonly to

And fatal, even if possible.

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falsehood, however little we might be able to trace the process by which all our conclusions are arrived at. And yet this sense of responsibility, felt to be so vital to all virtue, is almost quiescent in a majority of men, in every class. Responsibility for right opinion on some subjects is, indeed, distinctly questioned by many persons, and openly denied by not a few. People, no doubt, were startled in the last generation by the avowal of a celebrated statesman, "that a man is no more responsible for his creed than for the colour of his skin." The public were not then prepared openly to adopt that view. But men have now come much nearer to it. Thus, in theory, the limits of what are thought "justifiable differences," have been indefinitely enlarged; and in practice the doctrine of "extenuating circumstances" has been pushed to a hazardous extent. The pursuit of truth itself is often deemed to be quixotic, and the practice of virtue to lie beyond rigorous demand. The position supposed in the Duke of Argyll's thoughtful and popular book, *The Reign of Law*,—viz., "that all human actions are calculable beforehand," may indicate a point now reached in England by the prevailing ethics; and it may well arouse our attention; though it would be wrong to conclude at once that the calculable may not be contingent, *à priori*, as the doctrine of chances may show.

Conscientiousness in opinion is vital:

but in much peril.

5. The moral import of this doctrine seems to some of us to be self evident; but its ideal inconsistency with religion, and deontology in general, is sheltered by the familiar predestinarianism of our Puritan fellow countrymen, whose religious instincts happily have yet been strong enough to check, very greatly, certain logical results of their philosophy. But this cannot last. The pitiless self-assertion of logic must here, as elsewhere, be felt at last.

That this doctrine of the "Reign of Law" is by no means peculiar to a Scottish philosophy, will be felt indeed by all who mark the ethical assumptions of our best-known literature. The writings of Mr. Buckle, Mr. Lewes, Mr. Tyndall, Mr. Mill, and others, are pervaded by a kind of fatalistic tone, which society inclines to accept as "scientific;" though an open denial of responsibility is of course rarely ventured on. What is absolutely needed now is that men should be compelled to say carefully and distinctly that which they have been assuming vaguely, so that their principles may be known and judged.

It is popularly denied:—yet even Mr. Mill makes some protest:

6. For it is not in the higher literature alone that personal

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conscientiousness is growing faint among us. Our growing habit of "thinking in masses," has drawn forth even from Mr. Mill a timely protest in behalf of some individuality. We may trace dimness of conscience in the growing lack of interest in all elevated and difficult thought, among effeminate multitudes in the upper ranks of life,—their indisposition to what is real, and their fear of all plain-speaking, even in social intercourse. There seems to be a prevailing self-distrust, combined with uneasy self-assertion; and the feeling which is being generated is one of common scepticism, (though it may attempt a refined appearance of humility): And scepticism in its ethical results effects a sort of suspension of responsibility. (—And is there not the same timidity, and destruction of *individual manhood*, spreading in our trading community ?—)

7. Nor is the enfeebled sense of right and wrong, and of the obligations of the individual, less conspicuous in matters of Religion than in Ethics generally. The public treatment of ecclesiastical questions among us, and the rareness of all attempts to know the foundations even of our own convictions, are evidences of our moral condition as a people. For in so noticeable a phenomenon of our times as the change of hereditary Religions, by thousands of our people, for new forms of worship, the converts from faith to faith have but acted in crowds, and the change has signified, not unfrequently, a formal *surrender* of individual judgment; in which conscience itself is repudiated as "private."

Found in all classes of men.

It would seem unnecessary, then, at a moral crisis like the present, to excuse an earnest attempt to call men to examine their moral foundations: it is needless to say more in its general defence. It must, however, be added with special significance that all who hereafter profess themselves to be "Christians," will find it to be in truth a primary obligation to vindicate the laws of Duty, and the inseparable relations of Religion and Morality in the human economy; and to base their vindication on the most careful induction of the facts of our nature as men.

Need, therefore, of this examination of conscientiousness.

II.

8. As soon as we pronounce this word Duty, meaning that which ought to be, we contemplate future action: yet the idea expressed by "ought" has inherent reference to *some antecedent;* in other words, what "ought to be" must be based on "what is." But, obviously, we cannot

Outline.

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always reverse this statement, and assume that "what is" "ought to be"; for "ought" would then signify nothing. "What is" may be wrong. A pathologist who should mistake the facts of disease for normal conditions of nature would not err more widely than an optimist who deemed that "whatever is is right" in ethics. The more healthy and general the facts, the safer of course will be the inductions. The moralist, like other men, already finds himself in a great physical and social system of existence; and that which "ought to be,"—his moral fabric of thought, feeling, emotion, and action—cannot negative this. The ontological and the deontological must not contradict each other.

What *ought to be* is based on *what is*—(taking Being in the widest sense).

But the moment we say that anything in human life or conduct "ought to be," we assume a great deal. We at once recognize a real division of the world into Persons and Things; and in this take it for granted that the universe of Persons has to act on the universe of Things, and knows it. In this fact we find the rudiments of all moral philosophy. The action of persons, *ex mero motu*, is universally recognized in human life, and it is irrational therefore to deny it in philosophy, if facts are to guide us at all.

The idea of "ought" *assumes* a distinction between persons and things as a *fact*.

9. Close to this fact of Personality, or conscious agency, lies another, which none can overlook. It is, that all persons call one another to account, for some at least of their actions. No one doubts that in some cases he is *right* in so taking account of the actions around him. As truly as the distinction between persons and things is involved in the word "ought," however understood, so also the idea of Accountability is involved in the existence of "persons"; and some notion of right is implied in accountability. "Accountability," then, whatever be its verbal definition, is a fact to be examined. It is various both in degree and in kind, and out of these variations arise those difficulties which are so frequently the practical hindrances of duty. We should not attempt to deny those difficulties: if we do not meet them distinctly, we leave them for the speculator and Pyrrhonist.

The word "person" involves accountability as a *fact*.

10. The difficulties in the way of individual human accountability have no doubt a great cumulative effect when presented to us at all fully; but, after all, are effectually met by the *fact* that that they actually do not eliminate this "accountability" from any society of human beings, and never have eliminated it. The following may be taken perhaps as a general statement of the difficulties, and

Difficulties of the idea of accountability.

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may serve as preliminary to our analysis, if it be not indeed indispensable to it.

Statements of them.

Beginning in each case with the beginnings of our humanity, it is clearly impossible to believe in much responsibility in very young persons. Their exception, to some extent, is as much a fact, as the general rule of Responsibility for adults can be said to be also a fact on the other side. Then, as so large a proportion of mankind never live to maturity, a strict accountability would seem to be limited to a portion of the race; while obligations of duty should belong to all. (This is a philosophical as well as moral difficulty. See §§ 18, 164.)

1. Actual beginnings of human accountability in each case.

11. But among adults the diversities of condition are so great, and the hardships of moral position so considerable, that the same law of accountability, even with them, could not always be applied. Education and training must at length have affected every one of them for good or evil. The child of the most prosperous and well-disposed citizen, and the child of the exile from society attaining maturity in an atmosphere of crime, may both no doubt be held accountable: but few, in fact, will judge them wholly by the same standard; especially as what are termed evil influences appear to be more powerful than the good.—If we pass from this period of early maturity to a later, the phenomena are yet more intricate. After certain habits are fixed, men's characters still go on in gradual formation. Suppose they began ill, and became at length irrevocably bad, it would be hard to say what their personal accountability might amount to; though they will yet have, *as a fact*, the disapprobation of their fellow men. Such reflection would seem to enlarge our sphere of inquiry and oblige the investigation of the nature of *Habit*, whether good or evil, and its relation to deontology, i.e. to the personal decision of what "ought" to be. (§ 89, 90.)

2. Its varieties from the first.

3. The more advanced stages of it—(or Habit).

4. Question as to the import of *Habit* in questions of accountability.

12. But can we leave out of consideration the adult multitudes who, in different ways, have but partial control over any of their present actions—to say nothing of inherited disqualification in some cases, for all strict accountability? The position of women, that is half the world, is said to embarrass every theory of accountability; and the ancients very summarily excluded them, and some modern legists are also much inclined to do so. Then, add other dependent persons, minors, slaves, the imbecile, the ignorant, the infirm, the aged, and the difficulties

5. Large numbers of cases of qualified accountability.

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of any general theory of accountability may soon appear insuperable.

6. *De facto.* Influences of Religions, on personal accountability.

And beyond all this, the various Religions of the world introduce a wide range of considerations often coming into collision with each other, and not unfrequently with the ascertained deontology of our race. Some of these are so influential in personal action, that no philosophy of duty can finally omit their existence as *facts*.

But when all difficulties are stated, (and none are here intentionally passed over), the broad *fact* remains, on which alone philosophy can proceed: Man treats his fellow-man as Accountable for much; and the *fact* is all the stronger for its holding its ground, and outliving all the conceivable and actual difficulties which thus surround it.

III.

But the fact of accountability still remains.

13. It is with the full admission then of difficulties, both in theory and in experience, that we have to analyze this fact, that all men hold others in some degree accountable for their actions.

We must at once mark, in at least a preliminary way, what men really *mean* by "holding each other accountable." For first, it is no mere accident that they do so. To imagine a state of things in which the reverse could be true, would be to imagine something different from all human consciousness, relationship, and association. That mutual accountability, then, which belongs to our nature, implies approbation or disapprobation of each other, as felt and expressed under certain conditions. Nor would human beings bear to have it believed that their approbation was given except to what is *right*, and their disapprobation to what is *wrong*. Some primary ideas therefore of Rectitude and its opposite, or what is commonly called virtue and vice, right and wrong, however rudimental, would seem in the next place to be involved, *ab initio*, in the capacity of approval and disapproval implied in mutual accountability.

It implies approbation and disapprobation.

And involves ideas of right and wrong.

Every one may judge for himself, and from all he knows of human beings, whether these two conclusions are or are not based on the *facts* of our present life and nature.

14. But such results, it will be replied, are very vague. What,

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after all, do we mean by "right"? Can we define "virtue"? What is that "goodness," a belief in which, and a demand for which, is found to be so natural?—We must not avoid this: it is justly pressed by every one who is honestly dealing with such questions; and is the next point to be considered. What we have said thus far only touches the primary and apparent facts.

But here arises the question "What is Right?" or "goodness"?

There are some actions, then, (we need not specify them, or any of them, for no one will deny it), the perception of which, by other men besides the agents, is followed by quick approval. This approbation is sometimes an immediate sympathy with that which is done, as being felt to be noble, great, true, good (in whatever terms "the right" may be expressed). Suppose it has been a matter not at all concerning ourselves; or that we have had no time to refer to self; or that it was some historical or poetical heroism that had aroused our feeling, still the *fact* remains. Whether we can do anything towards fixing the definition of this fact, may be uncertain. That will depend on language, and many conditions of cultivated thought. But facts do not wait on definitions. In ontology the idea of Goodness is *de facto* fitness to the ends; but in deontology, we consider the doer as well as the thing done—fitness in acting as well as in the act.

The relation of approbation to that which is "good;"

15. It may be urged that this feeling of "approbation might be stirred for the thing done, as seen in useful results, and not as pertaining to the doer." This, of course, may be true; and it sometimes is so. But this is evidently not the whole case, even if it be the best part of it—which few would say. If an act of apparent justice were forced on the doer, we might be glad it was attained, but our approbation would not be the same as when we believed it to be *originated by the agent* himself. And on the other hand, we should have sympathy, rightly, with a man who denied his responsibility for anything which was *forced on him from without.*

both to the "good" in itself,

and to "good" in the doer;

16. If these be "facts of human nature," so certain that the opposites cannot be ordinarily supposed among human beings, it follows that an agent, or person, held by us to be rightly accountable has some kind and measure of "FREEDOM," or immunity at least from coercion. And thus the next point of examination we find to be,—What is that kind of "freedom" in an agent, which certain forms of approved action, or virtue, would seem, in *fact*, to demand?

the doer having therefore some *Freedom.*

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But unlimited Freedom is impossible.

Unlimited Freedom is impossible, being a contradiction. Every being, by the fact of his existing such as he is, is so far determined, that he is *not any other*. He is not, and cannot be, infinitely mutable, or infinitely free. His present existence, while it endures, implies a limit. What "he *is*," will limit what he "can do"; and as was said generally, so again in a special sense it may be repeated, the deontology depends on the ontology.

Limits of both an exterior and interior kind to be distinguished.

And not only is an agent defined, or limited, by his own essence and constitution, but every act, immediately it has become an act, is a determinate thing; and the doer may find himself further limited by what he has done. If ever the phrase "free action" is used of an accomplished result, it can only mean that the agent was not externally forced to do it. And the interior necessity, which arises from the constitution and limits of any being, must not be assumed to be more than negative. It says, "hitherto mayest thou go, and no further." But exterior compulsion, or necessity, we all own, intercepts just accountability, and is inconsistent with that goodness which is the object of approbation, as "free." In saying this, we are but stating *a fact*.

These limits, interior and exterior, differentiate agency.

Exterior compulsion interferes with just accountability in the agent.

17. How far the agent may himself remain virtuous, while under compulsion which he deprecates, is a divergent inquiry, co-incident with, but not intercepting, the present argument.

(Mediæval view.)

It may be remarked, as we proceed, that this distinction, of what Aquinas calls "natural and absolute necessity," and "necessity of compulsion," "quæ omnino repugnat voluntati," is familiar to the mediæval schools.

(*Sum.*, lib. i. q. 82.)

If the known laws of the world, or any outer events, interfere with the agency of man, so that in any case it cannot be said, (as Aquinas puts it), "*homo seipsum movet ad agendum*," the accountability to which we hold him is limited, or may be even destroyed.

Minute questions must not intrude here.

18. We must not encumber our examination at this point with any minuter questions as to some abnormal, unjustified, and partial conditions of human nature, in reference to the approbation of good, or the shame at evil. As physical philosophy assumes the goodness of nature as a whole, notwithstanding all exceptional appearances, and aims to learn rather than criticise; so the philosophy of humanity must regard man as constituted capable of action and human goodness. We premised that the

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facts of human nature itself, viewed in the largest way, should be the basis of our analysis. It is a fact, at least, that man does not praise, and perceives that he ought not to blame, any one for an action which is *wholly the result* of external compulsion or necessity.

We mark the point now attained in our analysis.

19. Here, however, we stand but on the threshold of our subject, though so significant a result has been arrived at. "Goodness" both as to its personal appreciation by man, and its intellectual definition, is yet only imperfectly stated. But it is necessary that each step we take, if but slight, should be sure—each conclusion gained, *a fact*. Our natural capacity and readiness to approve or disapprove, to praise or blame, practically settles that virtue or personal goodness is in some degree possible; for we cannot think man's nature wholly false in witnessing to this.

We have distinguished our approbation of that which itself is good, from our approbation of it as in relation with the conscious agent, or doer. The distinction also is based evidently on *fact*. But to clear it yet more we must inquire somewhat further as to what we meant at the outset (§ 8) by a Conscious Agent, *i.e.* the being whom we distinguish as a "Person."

We find that we must further examine, what is a conscious agent or "Person."

IV.

20. It sufficed to say, at first, that a conscious agent is recognized as a Person rather than a Thing. This meant that a Thing does not consciously originate that which is to be; and that a Person is believed by us so to determine a result, every time we reasonably blame or praise him. Thus, in the praise which we give to a person, there may be elements, (*e. g.* gratitude), which we could not possibly bestow on a thing, as such. But if our approbation implies, in any case, determining power in the conscious agent, it also implies that that agent might have refrained from putting forth that act of power. Now this antecedent possibility of acting, or refraining from acting, is what is usually and briefly expressed by the term "Contingency."

Praise of conscious agency implies *in fact* "Contingency" or a possibility of doing, or refraining from doing.

21. It is evident that no description of the circumstances and conditions of a conscious agent can, as such, tell us what the conscious agent is in himself. He holds the position between the being and not being of a possible action. The world accepts it as *his* action if he determines it.

A conscious agent is at the point between

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an act's being and not being.

But of himself we here know no more: we only know that he determines the act, which we approve or not, for what it *is*; while we praise or blame *him* for consciously doing, or originating, or determining it.

The frequent mystification of this truth in necessitarian writers arises simply from the suicidal hypothesis which they assume, that the agent is a mere point, or passive abstraction, in other words, a nonentity acted on by some such abstractions as "motives," "inducements," and so on.

22. At the risk of a seeming, but not real, repetition of our argument, it is indispensable that we here concentrate attention on this idea of "contingency,"—that possibility of an action's being or not being,—upon which, as on a middle point, the conscious agent has his stand in determining action, both the laudable and the blameable. If doubt had not been deliberately expressed by some, and indistinctly assumed by others, we might not thus need to pause to ask,—whether a contingency, (or the possibility of an action's either being or not being), is admissible in philosophy? We must not be diverted now from this, by any indirect issues; for the entire idea of a morality is changed by any indecision here. Once establish in the mind an unequivocal belief in a true (not partial) contingency, and a way is made towards a solution of countless questions of sophistical reasoning: Thus, "Whether human action may be calculated beforehand?" "Whether a higher intelligence than ours may 'foresee' all human action and its issues?" &c. are questions evidently connected with the previous decision as to Contingency.

Further observation of "Contingency" in conscious agency.

Denial of anterior contingency changes all the ideas of accountability.

(Collateral inquiries to be postponed.)

23. That outward circumstances may with considerable precision be "calculated" and "foreseen," we can fully understand: our social life could not proceed on any other supposition. Our human calculations may go even farther, and deal with probabilities; and beyond this, superhuman intelligence may regard all possibilities of action. But the relation of either foresight or calculation to the undetermined must be for subsequent consideration. (§ 138.) The point to be settled about Contingency is, not whether everything, *but whether something in human action is really determined by the man, as, quoad hoc, the middle point between being and not being?* To deny this, is to make the conscious agent to be passive, or even nothing, and unconscious things to be acting on him.

The whole issue. — Whether the conscious agent determines something himself?

24. To say thus that a conscious agent is not a real being,

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and therefore of himself determines nothing, is to contradict the broad fact that we all treat one another as real beings. What seem to be men's actions depend on the existence of the men. It is on this and on no narrow or insulated details that we can found our philosophy; it must stand, if at all, on facts of such extent and scope as to belong to the human race. And this is broad enough. *All* the phenomena of human praise and blame in all human intercourse support the assertion that the conscious agent is a real being who makes the internal decision which precedes certain actions.—And, that his ποίησις is analogous to creating —*i. e.*, a going forth of action from the agent himself, without essential change in the agent,—is but another statement of the same truth.

All the facts affirm the reality of internal decision,

It may be further said in opposition to this, that there may be some law of the inner nature of the agent himself, not simply allowing, but wholly obliging or necessitating all his actions *ab initio*. And we reply, first, that such a supposition rests, as far as we know, on no facts; and secondly, if proved, it would hinder our justly blaming or praising, or holding any to be accountable. It would convert every Person into a Thing, which is a contradiction, reversing all the phenomena.

and not from the law of his nature "obliging;"

which involves a contradiction.

25. Concede to us the possibility of our ever abstaining from that which we are about to do, and you may rightly praise or blame us for doing it. Deny it, and you deny the facts of all human social existence. Say of a proposed act of a conscious agent, "It *may* be, or it *may never* be," and you are saying what the whole world accepts and acts upon, so fully that our treatment of each other depends on it as on an axiom.

But to say this is to admit "contingency," which is no more than an abstract term to express this general fact. Whatever of the "calculable" or the "fore-knowable" may be pleaded by any philosophy, or any system hereafter, it must never be of a kind (§ 5) which will clash with the possibility of some acts being entirely contingent *à priori*; for that rests on the facts of human nature throughout.

Contingency as involved in conscious agency an axiom of social life.

26. If, indeed, any one would still wish to persuade himself that the phenomena of sensation contain the sum of all reality in the universe, and that the conscious agent is himself only a kind of subtler mechanism, and determines nothing for himself, what can be said to him but that he simply speculates? Facts are all on our side; while they assure us also that a conscious agent is a being such as

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no experience has been able fully to analyze, though forced to admit.

Should any objection be taken to our use of the word "conscious" agent, we pretend to no technical meaning in it. We take the word as expressing the fact, and no more, that there are beings in the universe who not only know things, but know that they know; *i.e.*, they look at themselves as agents—while some agents do not so look at themselves. A conscious agent is what is meant commonly by a Mind—(without questioning other kinds of intelligence). He is and knows that he is; acts, and knows it.—To be conscious of itself, the mind asks no other principle than itself—*i. e.* it knows that itself is a being (§ 23). To affirm any other being, we must, as Berkeley said, look to the phenomena. But τὸ *φαινόμενον* presupposes a being, to whom *φαίνεται*. Consciousness recognizes from the first anterior possibility of being.

What consciousness implies finally stated.

V.

27. We have arrived, then, at a more advanced conclusion as to the "conscious agent." His action is recognized by others as praiseworthy or not, as good or evil, according as he has been its determiner, unrestrained by external compulsion of any kind, and not fixed to action by internal law or constitution. But this determining agent does not make *Right;* otherwise every act would be right. We have still something to define if possible, as to "the good" itself—the deed *per se,* as distinct from the doer—either *à parte antè* or *à parte post.* To this, then, we briefly return. [See § 14, "*There are some actions, &c.*"] For if any action be good or evil in bearing a certain inner character as it comes from the doer, it follows that we must pursue the action back to the agent, and there contemplate and distinguish *it,* as well as him.

Next, if the "Good" be referrible at all to the agent,—we next must examine it in him.

If we think of the conscious agent, or "mind" (as we may now say), it is a simple fact that a thinker and his thought are not the same—not identical: we recognize at once a duality at least, viz. "subject" and "object." (P. Lombard would add "relation.")

The conscious agent,—mind, comprises duality.

28. Looking then at this intelligence, mind, conscious being, or Agent, as ideally prior to and apart from all phenomena of external being, what shall we find? Evidently, *ex vi termini,* its object would then be the abstract, or the infinite; and

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itself (as the subject) would have relation with that object: all the phenomenal being later (*i. e. in modo concipiendi*). It is true indeed that even some abstractions are measures of phenomenal and contingent being; but all are not so. Collective and general terms, for instance, are abstractions partly derived from the phenomena of experience; but some thoughts we certainly have more abstract than these. Thus, supposing our experience of various phenomena to suggest the general idea of a cause; yet how came we by the more abstract thought, that there *should be* a cause? This is an idea superior to the phenomena. For this the mind has recourse to itself, and its sense of the anterior. Experience alone does not teach us this; rather experience is itself taught, influenced, and guided at last by this recognized truth. The mind reflecting on itself adjudicates, by its own essence, on the manifestations of external being. It does not know how the manifestations of unconscious beings reach the conscious being: it only knows the fact. It does not know how itself is capable of reflecting on external, and even inferior beings; here, too, it only knows the fact. The agent stands in relation of some kind with the outer, or phenomenal world: he stands also in relation to an inner world, which (for want of a better term) we call the "abstract" and the "true-always." (§ 100.)

In this duality we must separate the thinker from his thought.

The thinker stands in relation to the phenomenal; and also to the "true-always."

29. Whatever be the essence of the mind or conscious agent, it is that which can contemplate outer life and action, and attempt by some inner criterion the decision of the *possible* and *right*. It falls back on its own essential relation to the necessary, and the "always-true," however indistinct it be, (as is life itself), in every emergency which demands a decision. In the power then to make such decision from our own internal resources, and in this alone, can we uniformly trace the beginnings of that "good" which, in action, we afterwards call "moral;" and which is distinct from the agent. (§ 76.)

The relation of the mind, essentially to the "true-always," is the beginning of the idea of "the good."

30. Further: There is a sameness of moral agency, if viewed largely, which is as unquestionable as the sameness of the phenomenal world. The great varieties of sensation and perception in the human race do not disturb our belief of the sameness of the outer experiences of men in all parts of the world, and in all ages; neither can the variations and eccentricities of moral agency alter the general laws of the praiseworthy and the blameable in conduct, in relation to which each conscious agent has to make such frequent decisions of his own. It is this sameness

In reference to "the good" or right, the *Sameness* of conscious agency a fact.

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of moral agency, as a whole, which protects our analysis from the objection that it finds every man a mere standard of right to himself. To say that man sees in himself the requirement of obedience to the "always true" is no doubt to represent the finite as in relation with the infinite, or at least with that to which the conscious moral agent defers without reserve, as to superior and essential right: but it is not identifying the agent with the *right*.

Which is not the same as making the individual his own law.

Man's nature tells him that there is and must be a rule of ideal right; it tells him too that this lies at the foundation of all fit praise or blame; and thus he is in fact prepared to make some estimate of action in others, and of the laws believed to be true in general experience.

The mind having relation to the absolute and the phenomenal.

31. While we thus are obliged to speak of the "true-always" as abstract, and even eternal and necessary, we are equally obliged to regard it as in relation with the very essence of conscious agency or mind. And we can thus conceive how the conscious agent may regard the absolute in the phenomenal, the abstract in the concrete, the infinite as partially reflected in the finite; the mind having essential inner relation to the absolute, and an active or potential relation to the exterior world of things.

We thus base all our conclusions concerning the good *per se* (as well as those which regard the good, in its proceeding from the conscious agent), on the closest examination we can give to the facts of our nature.

The good *per se* is thus necessary and absolute,

32. The facts, that we all rightly deal with men as determiners of some of their acts; that some freedom, and some contingency, are thus implied; and that the originator of action often is conscious that he ought to originate it in conformity with anterior truth to which his own essence stands related, are alike indisputable: as also is the *de facto* sameness of that truth among men.

If it be said that the eternal and necessary truths which are spoken of imply Eternal Mind as their perfect abode—granting that the Alexandrians were right in thus developing the Platonic ideas,—this hinders not our conclusion that all real minds or conscious beings, however limited, stand in relation to the ideal, the necessary and always-true.

and prior to external law.

Since then our analysis discloses the fact that ideas of the good and right belong to the first elements of our being, we can recognize a foundation for the moral and social accountability of man prior to all positive and external law. If, in what has been or will be

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examined, we seem to repeat with emphasis this word "fact," let it be borne in mind that we have to evince throughout that our conclusions rest on this broad scientific basis, and no other; not on opinion, not on theory, not on exceptions, but on such *realities* as we may appeal to, in the nature of man as man, in the broadest way and with no reserve that any one can think partial; unless he be a mere caviller, with whom, of course, we have nothing to do here.

The scientific basis of "fact" thus far insisted on.

VI.

33. We will carry our induction of facts somewhat further. Our conclusions as to the conscious moral agent and his relation to Right, will have additional clearness if we revert to the primary conception of ACCOUNTABILITY, which even in its simplest form has done so much for us; and endeavour to ascertain it more exactly and fully.

Extension of the analysis.

We cannot observe closely the details of human experience without perceiving that the idea of accountability or "responsibility" as it is more frequently called, is highly complicated in its uses. The difference of the two terms seems to be that the latter expresses the more abstract idea. "Accountability" describes the bare fact of our relation to certain persons, in certain circumstances; "Responsibility," the prior truth, that such a relation is recognized as normal, and includes in it, as we have said, some idea of right. In whatever variety of forms we meet with the fact of human accountability, this idea of "right" is latent: but it is modified greatly by the subject-matter.

Use of the terms Reponsible and Accountable.

34. We have thus far spoken of the conscious agent as an individual; but all conscious agents, as far as we know, have some dependence on others, and form parts of social systems very widely different. The obligations of the social system in which any of us live are signified to us individually in many ways,—by tradition and custom, by contract and common faith, but most of all by *law;* and thereupon we judge, and we act. Let us now speak of this last, viz. Law, as frequently comprehending the rest.

Responsibility in the social system.

35. There is here found a very broad distinction, which no observer can deny. There are some laws of society which we are responsible for obeying, in many ways; and yet we wish they were abolished, and inwardly disapprove of them; and there are other laws which we have a conviction *ought* to be what they are. A good man, as

Various kinds of Responsibi-

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lity distinguished.

both Aristotle and St. Paul remind us, discerns among laws, which are the good and which bad. Whether, however, the law be good or bad, the Responsibility for obeying it is such that the law-breaker must abide the consequences of his resistance. This is Political Responsibility, or Social, or Domestic. Of course all societies of men ought to conform their laws to the highest ideas of the good and the right; and in that case the political or social responsibility would assist the purely deontological or moral. But the ideas would still be distinct—of responsibility to obey Law,

Examples of this.

and responsibility to do Right as such. Good men have thought it right at times to break a bad law; but they incur all the responsibility of so doing. We can conceive of a man coming under the extremest penalties of laws, either evil or not understood, and yet having our sympathy or compassion, as the case might be. The martyr of liberty may perish beneath some tyrant's law, and win all our approval. The philanthropist may unsuccessfully withstand some wrong custom of society; but will eventually obtain the applause of the human conscience. The votary of science, involved at times in accidental suffering,

Distinction of the purely Moral Responsibilty.

finds the goodwill of his fellow-men may attend him in his disaster. But let us only be told of one who has been overtaken by law in the midst of some deed of cruelty or injustice, and we do not feel that this *ought not* to be, but, just the reverse, our conscience records its approval.

To incur the consequences of our actions and feel that it *ought to be so*—to be subject to a high law, and *feel it to be right*, this is Moral Responsibility.

36. But the great deontological problems as to individual duty become, as we now advance, more complex. A

Mutual relations of responsible agents.

multitude of responsible agents living together on this earth, in widely differing conditions, with extremely varying powers, all of them still bearing a nature which has a certain conscious relation to the perfect, the absolute, the always-true;—how can they work together? The Responsibility of each is in fact held to be individual; yet it is included in that responsibility, that men are *influenced by each other*. They are intended for this: their whole nature bears the marks of it. It is a *fact*.

37. Nor is this influence regulated in one fixed way; for then it would be mechanical, or material, and not responsible, in any moral sense. Each agent will in some degree influence some others, and the influence may be either good or evil. Suppose it to be evil, then the influencer may be highly culpable, and

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yet the man who *is* influenced retains responsibility, notwithstanding the injury often received. Not unfrequently, however, the conflicting responsible agents would be in such confused relations to each other and to mutual results, that the apportionment of praise and blame, individual approval or disapproval, would lie beyond the just discernment of their fellow-men. It is useless to complain that there should ever be this mutual influence; for that would be to complain that we are what we are. Human nature exists in and for society; this is undeniable. Yet each individual is held by all others to some internal responsibility. He is praised, he is blamed, for himself. This too is undeniable. The two facts are before us. Every responsible agent is essentially a being of some self-government; and where many such beings co-exist they ought not to injure the self-governance of each other, much less to destroy it. A multitude of self-governing beings would be a confusion, and not a world, or moral κόσμος, unless under some external regulation; and External Regulation, or Government of Society, has in fact always been found among responsible agents.

The adjustment of relation is often inscrutable between man and man.

Yet man exists in and for society.

38. Even if all men were capable of perfect self-control, yet they would also be capable of failure; and thus there would always be a need of external government. The functions of such government might conceivably be limited to a settlement of individual rights, or a guarding against aberrations; but they could never be dispensed with altogether. In an ideal state of perfection, the best external government of a responsible agent would be that which gave the fullest scope to individual action, taking one case with another throughout the community. And, on the other hand, the worst government for a community of personally responsible beings would be that which put the greatest amount of unnecessary restraint on the individual, or interfered coercively with him either in his acting or willing. A tyrannical government might so far interfere with some actions of men, that they could not be justly called to account for them at all. Again, it might even undertake, what indeed it could never discharge, the responsibility of certain members of the community; (though even then it must leave a large number of actions for which each agent would still have entire responsibility.) It would seem that the measure in which the external government, or State, is able wisely and safely to leave our conduct to our own control is a measure of the character of a government as wise or unwise, just or unjust.

Relations of the external to the internal government of responsible agents.

What the best government ideally.

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For the government is made for man, and not man for the government.

39. Admitting this, it follows that a bad administration of society under imperfect laws would increase the difficulties of much responsible agency; nor is it likely that any human government could secure the just responsibility of every individual in that degree which the instinct of praise and blame demands for all. A human government suitable to all the inequalities of capacity, power, and advantage in every case, however desirable, is impossible.

The best government *de facto* not the same always, or everywhere.

It is beside our purpose here to determine which is even the best of human governments. The decision would involve all the details of an inquiry as to which form of government gives the freest scope to the individual responsible agent, with the least social inconvenience. What might be best in the abstract might not be so in certain circumstances. Nor are even our theories of government as yet at all satisfactory. Thus, if a monarchy has the merit of simplicity in its action, it is the most remote from a recognition of our individual responsibility; and, on the other hand, if democracy aims at expressing the average internal agency of the responsible individual, it (on theory) suppresses much of the action of each—subordinating the part to the whole, and greatly interfering with personal action.—The personal responsibility too of those who, under any Government, or in any Society, have to act in masses, under social, military, or corporate orders, has to be provided for, because conscience, in fact, bears large witness to it; yet it evidently demands a higher regulation than is externally found for it in human society.

40. At this point, all those "varieties of responsibility," and the difficulties which we admitted at the outset (§ 10, &c.), come back upon us. The attempts of society to adjust them, however unsatisfactorily, are admissions that they *ought to be adjusted*, and even recognize the need of more perfect external government of responsible agents than humanity can be conceived to reach. Human government settles the legal relations which it will permit among all members of the community; and should aim to do so on some basis of *common reason*; but the least reflection will convince us how imperfectly as yet this has been attained. But beyond this, we see not that it can do full justice to the higher law of responsibility inwardly acknowledged by us. If we are to trust the facts of our nature, it is certain that responsibility means some freedom in the con-

The best human government cannot correct the inequalities of responsibility.

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scious moral agent; we are aware that this is sorely interfered with in countless cases; and that human external government cannot remedy a great part of this interference and wrong; and that we still feel that the responsibility exists, even when we are unable to explain it; and we find ourselves in the position of some scientific explorer, who comes on a fact which he wonders at, and yet must own.

VII.

41. It may be useful to mark how the Difficulties to which we now refer have been met by those who in various ways have had to deal with what are the facts of the world's life.

The ancient philosophers (with certain remarkable exceptions) found themselves obliged, by the necessities of the case, to turn as much as they could from the idea of Individual Responsibility, and attribute to the State even the highest governing functions for all. In logical consistency this treatment of politics implied *utility* as the only remaining ideal ground of *right*. It would not be enough for it to admit that the truest utility ultimately coincides with right; for this would not be denied; but it requires it to be said, that the "useful" and the "right" are not expressions of two ideas, but are essentially one and the same, in conception as well as fact. Yet it is most noticeable, how the only exact thinkers of the old world contradict their politics in all their ethical inquiries, and as if unintentionally admit the individual conscious agent as the responsible doer of right and wrong. Aristotle precedes his treatise on Politics by his Ethics, in which he constructs a moral system on facts of human nature examined in detail. In the closing chapter he is obliged to admit that he finds the "good" ultimately in the good man himself; καὶ ἔστιν ἑκάστου μέτρον ἡ ἀρετὴ, καὶ ὁ ἀγαθὸς, ᾗ τοιοῦτος, κ.τ.λ. (*Eth. ad Nic.*, x. 5); and this is scarcely in harmony with his view that the "State is prior to the household, and the household prior to the individual, as the whole is prior to the part." (*Pol.*, i. 2.) At least, the Personal Responsibility, if admitted at all in the sense demanded by the facts of life, would be lost in responsibility to the State: which is merging the right in the useful.

How the difficulties of responsibility are met in the pre-Christian philosophers.

By merging the right in the *useful*.

42. But the same difficulties of course have to be dealt with by governments of modern times, to whom the Christian ethics and individual responsibility are familiar. Any of the "mixed questions," as they are some-

How met in modern civilisation and law.

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times called (*i.e.* those which are partly of individual, but also of general interest), will illustrate this at once. As to Marriage and Education, to go no further, the State has to consult its own requirements, and also to satisfy the Personal convictions of individuals. This is attempted in many ways. It is comparatively easy when the members of the State are all of one Religion; as that may furnish a common basis of law and practice that may be insisted on for all. Where the religions are many, as in our own country, there is danger of a State being jostled into hopeless confusions full of peril to civilization itself. Whatever be the political settlement arrived at, it will be but an approximation to what the responsible agent would require, at least in a large number of cases.

By imperfect approximations to a moral ideal, at best.

43. The familiar form assumed by this subject at present in all Christendom, is that of an inquiry into the relations of the Church to the State; the Church being a Society of conscious agents in which the individual consciousness of right, and sense of responsibility, finds voluntary expression. In Mr. Gladstone's recent and most remarkable exposition of his own thoughts as a statesman, and of the political position, the question is thus delineated with his striking skill and accuracy: "Are we to say, with Lord Macaulay, or with Paley, 'government is police?'" On which Mr. Gladstone thus comments :—

Chiefly by utilizing the religious convictions.

(*A Chapter of Autobiography*, p. 58.)

> "It seems to me that in every function of life, and in every combination with his fellow-creatures, for whatever purpose, the duties of man are limited only by his powers. It is easy to separate, in the case of a gas company or a chess club, the primary end for which it exists, from everything extraneous to that end. It is not so easy in the case of the State or the family. If the primary end of the State is to protect life and property, so the primary end of the family is to propagate the race. But around these ends there cluster in both cases a group of moral purposes, variable indeed with varying circumstances, but yet inhering in the relation, and not external or merely incidental to it. The action of man in the State is moral, as truly as it is in the individual sphere; although it be limited by the fact that as he is combined with others whose views and wills may differ from his own, the sphere of the common operations must be limited, first to the things in which all are agreed; secondly to the things in which, though they may not be agreed, yet *equity points out*, and the public sense acknowledges, that the whole should be bound by the sense of the majority."

The fact recognized that government is more than mere police.

44. Every one will recognize in this, a just recoil from the

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short-hand politics which resolved simply that "government is police." But it seems to bring out the fact, that whatever *more* than police, government may be, it is so because the responsible agents of the community require it to be so. Each individual has to watch this action of the State, and constantly aim that it may correspond at last with his own internal conviction of the "right," the "just," the "always-true." To say that "the State has a conscience," as some have expressed it, is to put in an abstract way the truth that it is bound to conform, in its corporate acts, to the highest ideal of the responsible agents who form the community. (The case of the Family is somewhat different, being a *μοναρχία*. *See* Aristot. *Econ.* I. i.)

But whatever more it be, is contributed by the individual.

But when beyond this we advance to ask—*what* those questions are which the responsible agents of a community are to defer to their rulers in the State? the subject becomes so involved, that there seems little hope of more than tentative solutions, which, after all, will leave in thousands of individuals a sense of unredressed wrong, at variance with any high conception of a perfect Government of Moral Agents according to the excellence of their nature. And this must be inadmissible; for nature, as such, must be regarded as "good"; it aims at its proper good, and ought not to be ultimately thwarted in that aim, since that would be evil.

Meaning of saying a State has a conscience.

45. Some philosophers, no doubt, like Hobbes of Malmesbury, will still regard the laws of the State as furnishing the only criterion, if not the only foundation, of all duty. It would be difficult to persuade any but philosophers of this. Mankind at large always have believed, for example, that duties arise out of the natural relations of human life, quite independently of the support and sanction of state-law. Beyond which, the law of the State is "for the lawless and disobedient." It can have little to do with regulating virtue, except negatively, and therefore could not be its standard. A theory which regards law as the ground or standard of right is equivalent to a theory that all law is good. A bad law is a contradictory phrase in that case. But this is evidently absurd. Every attempt to improve the laws of any community is a recognition of a standard known to the individual mind external to the state-action as such. Indeed, it is quite conceivable, morally, that correct conduct, which should be "conformity to law," and nothing more, would not be virtue at all.

The meaning of Hobbesism; and that it involves a contradiction.

46. When it is urged against Hobbesism, or as it is called

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Erastian modification of Hobbesism equally a contradiction.

from another point of view Erastianism, that it would be a practical denial of truth and goodness, by its seeming admission that in different states "the right" and "the true" or "good" would be different, because laws are different; the reply has been that this would be only a temporary inconvenience, since Christianity, (which Erastianism vaguely assumes,) would tend to perfectibility, and so in due time it would be found that the varieties in law would become less and less, and the best interests of humanity and the best laws of States become everywhere coincident. But then, to admit this, is equally to *acknowledge an ideal of good law*, to which, all the while, the individual responsible agent was urging the State.

VIII.

47. The position now arrived at must be confessed at this point again to be sufficiently intricate. All the facts assure us of the mutual responsibilities of personal agents, living in community as their very nature requires. All the facts assert some kind of supremacy in each personal agent as absolutely essential to such self-government, as any fair responsibility assumes, and even demands. All the facts discover to us the incongruity and inequitableness of such personal self-governing beings existing in community without any moral balance held among them. And what are the necessary conditions for the holding of any such moral balance? Evidently such as no human law attains, or can be conceived to attain.

The embarrassed position of our conclusions at this point.

It cannot be conceived, because our personal determining in all matters of detail, and our inward relation as individuals to the "true-always," can with no exactness be ascertained by any other individuals, as far as we know, much less by the State, with that constancy which constant responsible action would require. Some government being needed among moral agents, it must not be government under any mere law that might be established, it must be government administered as to responsible beings—*i.e.* government suited to *their nature;* since every being must be governed according to its nature.

The need of a supreme governing power, if there be finite responsible agency.

48. The Governing power which has to adjust the law and practice of Duty in a community of responsible beings, each claiming by nature some self-government in detail, so far as he is responsible,

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must needs have minute knowledge of the *inner life* of each constituent member of the whole community. For if not, injustice and wrong may be done,—in other words, violence to the inner nature of the responsible agent; or else the inner relation of the responsible agent to the "true-always" must be set aside, and all deontology denied. That such a Supreme governing and unerring power is absolutely a necessity of finite responsible agency, and required by all the facts, is a position from which no ingenuity can escape; and which no sophistry or reluctance of faith can persuade the world to forego. Deny all accountability—all praise and blame—all personal agency as to various details—and all sameness of relation of the conscious individual to the "true-always"; or else acknowledge that a community of such responsible agents must be always ordered and maintained in action by a governing Power, whose nature is in harmony with necessary or absolute goodness, which is "true-always," and administers these laws equitably in all cases of real responsibility. There is no alternative, we repeat, but this: disclaim all honour and all shame; *resist all the facts* of human nature's accountable existence here; or acknowledge a Supreme Power, which knows the whole responsible community, and governs it.

The only alternative a *denial of facts.*

49. This is far more than a logical inference from the facts of human nature—(though no reasonable being can deny any exact logical inference); it is a Fact recognized by each finite moral agent on countless occasions. Take, for example, the dread of retribution for wrong that has been done; it is quite distinct from, though often coincident with, dread of the detection and punishment of human law; for men will often give themselves up to legal punishment in the hope of satisfying the Nemesis, as the heathen said, which haunts the wrong-doer. This is no superstition merely, (though as a fact it would not, even then, be without meaning); it cannot be got rid of by alleging its partial character in different individuals; for we all have too much sympathy with it to suppose that it is not part of our nature. "Whom vengeance suffereth not to live," is a well-known line marking a real trait in man—his sense that he is under a higher Rule. The question that must here be met is one of the most fundamental—the most vital—that can be entertained. Many who may have followed us thus far, will attempt to pause here, and assert for the Supreme Governing Power an Impersonal Existence only, as what is called a self-acting Law of the universe.

The individual responsible agent has a sense of a higher rule.

50. The primary difficulty in the way of so Pantheistic a view

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Whether Pantheism satisfies this sense.

is that it is, as far as appears, not *moral* at all. It implies that all our Deontology is presided over by a mechanical and unconscious influence,—which is a contradiction; for if, in the last resort, the praiseworthy or the blameable in human responsible action is judged in detail by unintelligent power, acting without knowledge of us, and our praise or blame, its whole character is changed. Nor is the responsible agent satisfied by this in any way. It answers none of his needs. It denies his deep instinct of superiority as an Agent, and not a mere Thing; and the conviction that as an agent he will be dealt with by an Agent Superior to him. (It contradicts too the fact to be further dwelt on, that he *does not regard himself as the highest* conscious agent in the universe; but conceives always at least of One above him, however indistinct the conception.)

The character of the Supreme Governor to be known.

Thus at length, in going down into the facts of our being, we find ourselves inevitably confronted by the solemn presence of "Him with Whom we have to do." We have no option but to fix our gaze now on the character of the Supreme Moral Governor of the world. And "if there is to be any virtue or any praise," we must not shrink from this.

51. There is a collateral conclusion which here already forces itself on our attention, in reference to that increasing unconscientiousness of thought and action which we spoke of (§ 6) as one occasion of our entering on this analysis,—and it is a conclusion which will grow on us now at every step in our argument,—that if we be thus by our very nature accountable beings, it will be impossible without severe injury to thwart this nature. As in the case of all other violation or disregard of the foundation-laws of being, there is a certain retribution in the nature of things, so specially in this case. The range, too, of responsibility in beings like ourselves can only be limited by our powers. There is no department of intelligence or action from which we shall find that conscience can be excluded, or rather in which it is not by nature supreme. This will appear more fully hereafter, when we come to see, how we are not merely under the exacting watchfulness of our fellow-men in our accountability to them —and not merely under our own self-judgment as self-governed beings—but under a Government which is in perfect relation with us, and with the "always-true."

A practical conclusion thus far.

The CHAIRMAN.—I am sure that I need not call upon those who are present, and who have already manifested their approbation, to express more

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formally their thanks to Dr. Irons for his exceedingly valuable paper. (Hear, hear.) It is a paper that I am sure cannot be properly discussed by those who have simply heard it for the first time. The true value of this paper will be found when it is taken home and calmly read and considered. The subject of which it treats is one of the greatest importance in its bearing upon philosophy, and upon all English and even all European thought. And I am sure that those who know what course that thought has taken will appreciate the good service Dr. Irons is doing in bringing the question fully before this Society. The paper just read is, I conceive, one which could only properly be brought before a Society like this; and if this Institute had not been established, a paper like the present could not have been read in any other Society in London. (Hear, hear.) It is now my duty to call upon any gentleman who may have any remarks to make, either in accordance or disagreement with the paper, to do so, for here we invite the fullest and widest discussion of every subject, and with the most perfect freedom.

Rev. Dr. Rigg.—I will venture, Mr. Chairman, to open the discussion by a few remarks. We must all of us have felt the truth of your remarks as to the exceeding ability and great value of this paper. In fact there are some parts of it which rise far beyond the mere level of ethical discussion, for they rise to the height of ethical apophthegms, and have an eloquence of an exceedingly impressive order. We must have felt some of the later passages to be especially of this description. There was also one passage in the earlier part of the essay which struck me exceedingly. I am not, however, going to occupy the time of the meeting in dilating upon all the excellencies of the paper, because, if I did so, I might take up the whole evening; but this one particular passage greatly struck me:—

"For to go on without a philosophy is to build without a foundation. And more than this: if it be done long and deliberately, it is practically to dispense with conscience—a danger by no means remote. To form an opinion, or to take a side, without feeling bound to the utmost of our power to form the right opinion and to take the right side, (as if to know right and to be right were unimportant or indifferent), must be demoralizing."

I think that strikes a chord which needs to be sounded with very great distinctness at the present time. I think, also, that the remarks which Dr. Irons has made in regard to mere "thinking in masses," and the necessity of conscious individuality in principles and convictions, are exceedingly important. We must all agree that, even as regards the foundation of our religious observances and worship, there is very great danger lest we should be content to have no basis whatever on which to rest our faith. At the same time, Sir, I venture to think that Dr. Irons, when he comes into contact with metaphysical problems, is not so happy as when he is dealing with problems of moral philosophy. Dr. Irons will excuse the freedom of any remarks I have to make on that point. In fact, he has himself set us an example of a very happy freedom in the remarks which he has offered himself upon other papers which have come before us from time to time. I

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say, then, that I think that when Dr. Irons leaves the ground of morals to come to metaphysical philosophy, he is not so happy as in the other parts of his paper. I will ask those who have the paper in their hands to refer to the following passage :—

"A conscious agent is what is meant commonly by a mind, without questioning other kinds of intelligence. He is, and knows that he is ; acts, and knows it. To affirm itself, the mind needs no other principle than itself."

What does that mean? I thought that it had now come generally to be admitted that the mind does not act itself except in coming into contact with something that is not itself. I thought that it had now come to be generally admitted that the mind only knows itself as subject—as the "ego," by coming into contact with that which is the object. I suppose that is now generally admitted ; and therefore I don't precisely understand in what sense Dr. Irons says that "to affirm itself the mind needs no other principle than itself," and "to affirm any other being we must, as Berkeley said, look to the phenomena." I apprehend that the mind, first of all, is conscious of the phenomena, and must be conscious of the phenomena, in reality, that it may be conscious of itself. The question of the origination of "I myself" is one of the most delicate and difficult problems belonging to metaphysical inquiry ; but, if I do not misapprehend what seems to be the meaning of this passage, it implies that in reality the mind, in its dark and solitary abode, before it has come into contact with any external phenomena whatever, is conscious of itself, and knows itself before it has any knowledge whatever of anything else——

Dr. Irons.—That is not what I intended the passage to imply, certainly.

Dr. Rigg.—If that is not the meaning of the passage I will turn to the next page, where I find the following :—

"Looking, then, at intelligence, mind, or conscious being as prior to and apart from all phenomena of external being, what do we find? Evidently, *ex vi termini*, its object then must be the abstract, or it may be the infinite ; and itself (or the subject) has natural relation with the object. All that is phenomenal is later."

Again (I only speak by way of inquiry) it is necessary that we should know more clearly what the meaning of these words may be. I think the natural, if not the true sense (and Dr. Irons will inform us what is the sense in which they have been used), seems to be that the object of the mind is the abstract or the infinite, and that all that is phenomenal is subsequent ; whereas, as it appears to me, we must have the phenomena before we get the abstraction. Abstraction is the process of generalization from the phenomena ; so that the mind must be brought into relation with phenomena before mental abstraction is possible. Then I go to the next passage :—

"It is true, indeed, that some abstractions are measures of phenomenal and contingent being ; but all are not so. Collective and general terms, for instance, are abstractions, partly derived from the phenomena of experience ; but some thoughts we certainly have beyond these."

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I do not know whether Dr. Irons means "before these;" but, as far as I can judge from the preceding context, as well as that which follows, his meaning seems to be that we must have some thoughts prior to the experience of phenomena. The illustration proceeds:—

"Supposing our experience of various phenomena to suggest the general idea of a cause, yet how came we by the previous thought that there should be a cause?"

But if the phenomena suggested the general idea of a cause, how could the thought of a cause be previous to the phenomena? "If the phenomena suggest the general idea of a cause," I presume that this is in accordance with what is generally accepted in the analysis of our own experience. There is a mind. That mind, until it has the stimulus of some outward phenomena—until, in some way or other, the sensibilities with which we are endowed are brought into play,—I presume is generally understood to remain in a condition of blankness. I suppose that it has powers, and that these powers are not thoughts nor ideas, and moreover that they are latent. I suppose that it is not until after the phenomena of the outward world—in fact, objective things—have been brought into contact with the mind, that anything like consciousness in the mind itself, as distinct and apart from outward things, can possibly arise. I suppose that our mere perception is in some sense and some degree analogous to the perception of the inferior creatures. There must be, before there is the consciousness which belongs to the human being, a sense of "I myself." I suppose, further, that there must not only be a sense of "ego," but some act of volition before an idea of causation can arise; and it is from the fact of our exerting will consciously, with a definite purpose and a sense of "I myself," feeling that we have a power to cause something, that a general idea of causation arises. And this being taken in connection with what is seen and felt outwardly, produces the general idea of causation existing in the mind. That is the state of the case so far as I can judge; and the sentences which I have read either do not clearly express Dr. Irons's meaning, or do not accord with the general understanding—or, I think, with general experience —in regard to these points. Then, says Dr. Irons, "that there should be a cause is an idea superior to the phenomena"; but the question is, is it prior to the phenomena? That is the real question. I suggest that it is not, so far as the individual subject and agent is concerned. He goes on to say:—

"This is an idea superior to the phenomena. For this, the mind has no resource but itself."

But if the mind had not been brought into contact with the outward world, I suppose that that idea would not have arisen in it at all. Again, "Experience does not teach us this." I presume that experience does not teach it alone, not without the intuitive power or principle,—whether that is implied all through or not. (Hear, hear.) But can we say that the intuitive power and principle gives us the idea by itself, that the mind is not to take

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anything to guide it, that it is to look at itself and judge for itself, and that, apart from all things outward, it can get the idea of causation? I think not.

"The mind reflects on itself, and adjudicates on the manifestations of external being; it adjudicates by its own essence."

I entirely agree in that——

Dr. IRONS.—That is all I want to imply.

Dr. RIGG.—Dr. Irons says that that is all he means. Then I entirely agree with him; but I thought that the language which I have read did not seem to be consistent exactly with the principle expressed in that sentence. There is another sentence to which I wish to call attention. Dr. Irons says that "Aristotle was as truly an inductive philosopher as Bacon, and Bacon as much as Comte." In the sense which I suppose this sentence is intended to bear, I do not precisely accord with it. I don't suppose that Comte was an inductive philosopher, though no doubt he has written much about the inductive method. I do not think that Bacon was an inductive philosopher, although he was the father of inductive philosophy. Aristotle certainly did not teach how, on any definite method of induction, to attain truth by examining the nature and history of facts, but I suppose that there was a germ of the Baconian inductive philosophy in Aristotle that might be fairly developed into something Baconian. I suppose that Bacon really taught inductive philosophy, but his works give us specimens of the inversion of inductive philosophy, especially when he directs his attention to speculations in regard to nature, or to questions of physical or metaphysical properties. I suppose that Comte, though unquestionably an exponent of inductive philosophy, and though upon his own view of it, he professed to teach a philosophy of his own consistent with induction, yet would hardly be admitted by many, and by none, except the most enthusiastic of his own followers, to be a very choice or illustrious instance of an inductive philosopher. I think that his philosophy is one which does not base itself upon facts. I should be very sorry to admit that his was inductive philosophy; and I think that Dr. Irons has gone some way in the paper to show us that Comte's philosophy can hardly be said to be a true induction from facts. I think, therefore, that we should be a little careful as to how readily we give the title of inductive philosopher to such a man as Comte. Considering the exceeding accuracy with which Dr. Irons generally speaks on these matters, and knowing his discrimination, I think that on that point he has given the adversary inadvertently a little advantage which it was altogether needless to give. I merely wish, in conclusion, to say that the appeal made at the end of the very able paper in regard to the necessity of a supreme principle and governing power, strikes me as just opening a vein of thought which it is of the utmost importance for us at the present time to keep in view. Surely we must abide by the principle that "there is no alternative but this: we must disclaim all honour and all shame; resist all the facts of human nature's accountable existence here; or acknowledge a Supreme power which knows the whole responsible community and

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governs it." I could have wished that Dr. Irons, when in this vein of thought, had gone a little further, and not contented himself with that strong, true, and well-put sentence with respect to the Pantheistic view of an impersonal existence as the supreme governing power,—as implying that all our deontology is presided over by a mechanical and unconscious influence, that in fact there is left us no such thing as a moral system at all. I could have wished that he should have shown us that people who do not believe in a personal God should at once call themselves Atheists ; and that Positivists should not call themselves Pantheists at all. It appears to me that the use of that word Pantheism is calculated to mislead us. Indeed we have no Pantheism, except Atheism, which borrows the phraseology of Pantheism in order that it may hide its own nakedness. Let Atheists set to work to write logically ; and consistently banish out of their phraseology everything which implies a governing mind, or providential ruler. Let them banish all that means that there is in truth, external to us, a moral or intellectual plan in the universe. Of course the plan must either be in us individually, or else it must be in the Maker ; it cannot be nowhere ; and if there is no maker or ruler outside of us, then is there no plan in the cosmos, in the universe, except what has been put into it by us,—what has been imagined and invented by us or for us. Therefore let all language which seems to imply a plan, a unity of purpose,—all, in fact, which the very principles of Atheism deny ; let all this be done away with, and let Atheism stand forth in honest nakedness, in utter denial that there is any real system outside of us, or any true comprehensive unity. Let Atheists write all their books, teach all their ethics, do all their business, with this plain meaning, placing their principles before the world in the midst of the human world of affections, hopes, motives, and impulses ; then I think they would so strike upon the consciences of all, that the result would be that there would be very much less Atheism in the world than at present exists. (Applause.)

Mr. Reddie.—I think it will perhaps be desirable, after the concluding remarks of Dr. Rigg, that I should remind you that Dr. Irons's paper is not yet complete. What we have heard is only one part of the subject ; and probably some of the last remarks might not have been made, if we had had the whole matter before us. But there is one thing I should like to say with regard to some observations of Dr. Rigg. He seems to find fault with Dr. Irons for not calling his adversaries names which they do not like. I know that this is very tender ground among our opponents, whether they call themselves Positivists or Atheists or Pantheists. Mr. Holyoake as well as some other professed Atheists were invited to be here this evening ; and he has stated in a letter that he is sorry, as he was obliged to be in Glasgow, that he could not be present. His letter is couched in language very complimentary to Dr. Irons, from whom the invitation had been received. We are most anxious to have such subjects thoroughly discussed ; but I think there are few Atheists or Pantheists who would venture to discuss this paper off-hand, though in all probability we may look for some answer to it in a written form. Any Atheist who came forward to reply to such a logical array

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of arguments as those which have been advanced, would be a bold man—much bolder than I find Atheists generally are. Several of the points which have been referred to and commented upon by Dr. Rigg are points which I had marked myself as requiring some notice ; and the first was that with regard to Comte being alluded to as an inductive philosopher. I do not, however, suppose that Dr. Irons considers Comte to be truly an inductive philosopher ; but I understood him rather to mean that Comte puts himself forward as an inductive philosopher and calls himself one. Comte, no doubt, considers himself *par excellence* an inductive philosopher ; but Dr. Irons expressly states that he does not regard him so, because in the concluding sentence of the paragraph (partly quoted by Dr. Rigg) he says,—"If any of us complain of the Positivism of the present hour, it is not for its appeal to facts ; it is *because of its not examining the whole field.*" That means, it disregards some facts. At the same time we would gain nothing by coming forward and casting in their teeth that they are not inductive philosophers because they disregard facts. I think that the way in which Dr. Irons has treated the opposite side, namely with every courtesy and kindness, is one that deserves commendation. Calling of names is not to be admired as a rule ; and I am only sorry that in the controversial papers which we sometimes necessarily have here, it has not been always possible to avoid doing so. But we have had the gauntlet thrown down to us rather roughly, and I do not see why we should be more tender in this respect than the opposite side ; for we are bound to express our thoughts, and are free to speak as plainly as they do. In regard to another point which Dr. Rigg has criticised,—we know that we ourselves exist by being conscious of it ; but we are equally conscious of the *non ego*, or of what we see around us. The *ego* and *non ego* are co-relatives. The one, you will find if you think deeply, implies the existence of the other. There are two points besides, which I wish to notice. Dr. Irons says, that we approve of an act or not from what it is. The argument drawn from this, I think, might even be strengthened ; because it is not merely the act itself which leads us to approve of it ; but, when we can discover it, the intention of the act. That makes the argument all the stronger in favour of what Dr. Irons has advanced. For there is another important passage in which he says (at the commencement of the fifth section, § 27)—

"We have arrived, then, at a more advanced conclusion as to the conscious agent whose action is recognized by others as praiseworthy or not, as good or evil, according as he has been its determiner, unrestrained by external compulsion of any kind and not fixed to action by internal law or constitution."

The consideration of that is of very great consequence. It helps us to understand better one of the most consoling and most important principles of Christian ethics, respecting our incapacity for judging others. Because, if you consider what Dr. Irons states here, you will see that we never can know all as regards others, which we can know as regards ourselves. We never can know all the influences which bear upon them, arising from their habits,

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their natural disposition, or their motives, and consequently we never can truly judge our neighbours—we can only truly judge ourselves. This consideration enables us to see that when we have a thorough knowledge of all those facts which nature itself teaches us, we can better understand the absolute wisdom, and the wonderful knowledge of human nature and its requirements, which we find exhibited in revealed truth. There we are exhorted to examine and judge ourselves, but not to judge or condemn others; because we cannot possibly do so completely. There is One only that can truly reach the hearts of all, and judge all men:—"There is One that seeketh and judgeth." (Applause.)

Rev. C. A. Row.—I feel it due to Dr. Irons to express my cordial approbation of his paper. Out of every twenty sentences I acquiesce most fully in at least nineteen, and this is a fact more remarkable because I never met Dr. Irons except in this room; and although our modes of thinking are somewhat different, we have arrived at the same fundamental conclusions on all important points. And this leads to a hope that if we only pursue the right course of taking the facts alone, getting rid of mere abstract and *à priori* theories, and arguing entirely from the facts, we shall find that many who think that they are wholly at issue with each other, are pursuing a path which in the end will enable them to arrive at the same conclusions. Dr. Rigg, who belongs to an entirely different school of thought, seems also to have arrived at the same conclusions; and quite agrees with Dr. Irons in the great importance of having this subject well ventilated. No one can be acquainted, however slightly, with current literature, but must know how excessively it is leavened with Positivism. It is impossible to read extensively and not to feel that the principle of the accountability of man has been dimmed, in later days, by philosophical speculations, and though this paper of Dr. Irons may seem, at first sight, a dry one (for it is impossible to do it justice without having had it previously in your hands), I have no hesitation in speaking of it as one of the very best defences of the doctrine of human accountability which I have ever heard. Dr. Irons has taken the best possible ground in the mode of procedure which he has adopted because he has based his procedure upon facts, and facts alone—deducing from those facts a theory only which will be covered by the facts and nothing more; and I quite agree that if we can only get rid of the miserable habit of resting upon baseless *à priori* theories, and make our deductions from facts alone, we shall come far nearer to a substantial agreement in respect to all questions affecting morals, religion, and philosophy, than we are at present at all aware of. Dr. Irons has put before us the important position that the facts of human nature can be taken as the ground of a science of human nature. That is a principle he distinctly lays down, and I have great difficulty in criticising his paper from the very fact that we have only a portion of the argument before us. If we had the whole, or even the greater portion of the subject before us, I might find something to criticise on the principle that it is much easier to pull down than to build up. I am impeded also by the consideration that if I really

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wished to do justice to the paper, I should quote it from beginning to end in the strongest terms of approbation. It seems to me that the whole of the original groundwork of the essay rests on one fact which constitutes the basis of human accountability, and that that resolves itself into the general principle that every being is accountable and responsible who can speak of himself as "I." That seems to be the basis of human accountability, and it involves the very principles of all voluntary action; for the meaning of being able to assert of ourselves "I," is that we apprehend a notion of personality. I suppose that there is no lower order of creation the members of which can think of themselves as "I," and I agree in the dicta of Mr. Morris in his Cambridge lectures as to the great importance of having a clear conception of this subject. There is also a set of lectures written by Professor Ferrier, which generally agree with Professor Morris on that point; but when I came to another point I was profoundly astonished to find that Ferrier could assert that the power of thinking myself "I" creates "I." That I read with unmitigated astonishment. It almost knocked me down, so astonished was I to find that a man like Ferrier could make so tremendous a jump to a conclusion. There are many things which, did time admit, I should like to draw attention to, and especially to many passages of the highest importance in the paper with respect to moral philosophy, but as I cannot do so at present I will simply glance at one or two points. Dr. Rigg, I think, made some observations on the subject of causation; and I wish to state the impression formed on my own mind on reading Dr. Irons's paper upon that subject. I thought that Dr. Irons meant to assert that all proper notions of causality were derived not from phenomena but from "self," and originate in a feeling of "self" as an agent. That is what I understood him to mean. I am aware that there is some little obscurity in the statement, and it is not to be wondered at, because to compress such a mass of matter as is involved into a paper like this, is a desperately hard undertaking; for it is far easier to write a voluminous book than it is to compress and concentrate its matter into a small space. The public, too, is a little unreasonable; for, guided by the size of the book, they will pay more for a vast mass of matter, so diluted that the point is almost lost, than they will for a smaller work which contains the whole of it much better expressed. That is my impression of what Dr. Irons meant to say. I think that that is a most important point to establish in these days, for I fancy that I have sometimes heard something to the contrary even in this room. My idea of what is our notion of causality is that it is derived from the conception of "self" as an independent moral cause, and one passage I can refer to in which Dr. Irons has made that pretty plain where he speaks of man being the creator of his moral action. That passage is worthy of great commendation. (Hear, hear.) It fully explains that Dr. Irons meant that man stands in the relation of a creator to his moral action, and it very much illustrates what is meant in the Old Testament, where it is said that man was made in the image of God (applause); that, as the Almighty in his infiniteness is free and independent without limit, so finite man is, in his own finite sphere, a free and independent agent. The fact of the voluntariness of

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human action is at the foundation of all possible conceptions of human morality. It is perfectly evident that if I am not a voluntary agent I am not responsible. Hence, persuade me that I am not a voluntary agent, and I cease to blame myself from that hour. Let us illustrate this a little, for it is most important that we should have a clear conception of it. Suppose I kick a stone on the ground and it hurts my foot ; I am perfectly aware that I have no occasion to blame the stone, and that not being a free agent it has no responsibility resting upon it. But now let us see how the notion of a sense of responsibility arises in our mind. Suppose a person near whom I am standing takes hold of the fist of another and thrusts it into my face, I am not angry with the man whose fist has been thrust into my face, but I am with the person who thrust it : therefore it is necessary that there should exist the idea of a voluntary agency, because we cannot excite the feeling of anger in ourselves ; it must be excited through a voluntary or what we deem to be a voluntary agency. But this admits of one more illustration. Suppose the man whose fist is knocked into another man's face turns round, and by a smile or in any other way expresses a conscious approval of the act, then a share of the blame becomes attached to him, and there is a responsibility attaching to both parties. This shows that we may attach blame or praise to an action which, though at first strictly involuntary, yet, by a subsequent act of the agent, is made his own. And this is the great principle upon which all morality must rest. Of course every custom and every system which denies the voluntary character of human actions is laying the axe to the foundation of all principles of morality in man ; and I need not tell you what a very large number of systems are involved in that category. All those to which Dr. Irons has referred very distinctly lay the axe to the foundations of the voluntary character of human actions in some form or other, and in this way destroy all sense of human responsibility ; for I defy a man to feel any responsibility for any act which he has done, if he has not the sense that he might have avoided it ; the foundation of all responsibility being that you may do an act or avoid it. I now wish to draw your attention to one or two other passages in the paper. There is a small paragraph which I marked before I came here, feeling some doubt as to the accuracy of its assertion ; but when Dr. Irons read it he put a certain emphasis upon the words, which made me at once comprehend their meaning, and I fully agree with Dr. Irons. The passage is this :—

"The responsibility of each is, in fact, held to be individual ; yet it is part of that responsibility that men influence each other."

I perfectly agree with that, as Dr. Irons read it, but I had mistaken the meaning of it ; and I think that if he could possibly mend that sentence, it would be desirable ; for I came here with a decidedly false impression as to its meaning. I think that Dr. Irons has hardly done justice to his subject in his remarks upon internal compulsion. I quite agree that it arises from the limit of the paper that he has not brought before us fully this subject of internal compulsion. We do acts, resulting from force of habit, which qualify

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the sense of human responsibility. Looking at the question practically, it assumes this form. You and I are made to a considerable extent what we are, by the force of habit. This force of habit, when once formed in us, does, to a certain extent, modify our responsibility, but does not destroy it. And what I admire in Dr. Irons's paper is that, while he persists in keeping before us the facts, he points out that, treating the question in whatever way you will, there is still some responsibility attaching to the conscious agent. I particularly draw attention to this admirable feature in the paper—that, while he plainly persists in bringing before us the whole facts, he shows that, however they may modify our view, there still remains some responsibility. It does not follow because I have not got universal freedom, that I have not got some freedom. It does not follow because I have not universal responsibility that I have not some responsibility ; and that is quite enough for the purpose for which it is intended. There is another passage to which I would direct attention, and that is with reference to the position of the State. Dr. Irons rather implies than says that the State has a conscience. I quite agree with his reasoning, but I wish to draw attention to his statement that the State is bound to act according to the conscience of the various individuals who form it——

Dr. Irons.—I do not say that certainly.

Mr. Row.—It is pretty much the same thing to say that the very notion of a conscience in the State or corporation, implies the action of the individual conscience in its members. But I am afraid that is not always so, and as this discussion is rather a dry one, perhaps the Chairman will allow me to relieve it by narrating an instance of the kind of conscience which is sometimes to be found in a corporation. When I was at Oxford, the Municipal Corporation Bill had just been passed. The Corporation of Abingdon were very much noted for good living, and they had a splendid cellar of choice wines which they did not like to leave to their successors. What did they do ? They passed a resolution, that instead of meeting once a fortnight, as was their custom, they would meet three times a week, and drink up the choice wines, in order that they might not fall into the hands of the enemy. (Laughter.) That is an illustration of what may be called the conscience of a corporation. In one word, it seems to me that when we get into a party, we get the lowest perception of conscience. I even feel that this is the case with what are called "Corporations sole." Our friend Dr. Irons is a "Corporation sole," and I confess that I would rather deal with him as Dr. Irons individually than as Dr. Irons, Vicar of Brompton. A corporation of any kind, somehow or other, affects a man's conscientiousness ; but when you come to a corporation aggregate it is a most terrible matter ; and the worst form of a corporation aggregate is that of a religious party, for it seems to destroy all conscience in the men individually, for there are hundreds of men professing and calling themselves Christians who in a corporate capacity will not scruple to do what they certainly would not do as ordinary Christians, and therefore it is that I have a great objection to a state corporation being described as having a conscience——

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Dr. IRONS.—I beg to say that the Vicar of Brompton has never joined any party yet,—be it religious or otherwise. (Hear.)

Mr. ROW.—I never said that you had. I merely mentioned as an illustration of what I meant when I said that I should prefer dealing with Dr. Irons as an individual, to dealing with him in his corporate capacity, in perpetual succession, as the corporation sole of the vicarage of Brompton. (Laughter.) I will conclude by making an observation or two with reference to Dr. Irons's statement in respect to the ancient philosophers. I agree with him in what he says with respect to the difficulty which the ancient philosophers were under when dealing with morals, from having no other standard of duty than that which was due to the State, and which necessarily led them to view morals under a political aspect; but another reason which induced them to view them under a political aspect Dr. Irons has not alluded to, and that is that they felt that they had no sufficient moral force to bring to bear upon human nature in order to induce it to do what was right, and they thought that the only moral force was that which was created by the State; and there is no speculator or ancient moralist with whose writings I am acquainted who has not proposed to create an ideal state. Aristotle, Plato, and other philosophers, every one of them, found it necessary to adopt the principle of an ideal state, in which they hope to form a society of men who by being brought up under suitable laws, would have some chance of becoming virtuous. Now this is a very important point, because it bears witness to one great fact in Christianity. Christianity alone has fulfilled the philosophic aspirations. When Christianity came into the world, the whole was complete. Then were fulfilled all the speculations of Aristotle, Plato, and other philosophers, we may truly say, by the creation of the Christian Church. But Dr. Irons, I cannot help thinking, has made rather too strong a reference to the fact that wrongdoers have a strong feeling of self-consciousness. I am prepared to admit that in many cases conscience does condemn wrong-doers, and that they have given themselves up to justice under its influence, but at the same time there is such a persistence of wrong-doing that it destroys in some men all perception of right and wrong. I have been recently reading the history of Philip the Second of Spain, and if we reflect upon all his violence, his murders, his persecutions, his known predilection for lying and assassination, and that there was no kind of crime which he scrupled at perpetrating, it is a fearful thing to think that that man by a continued persistence in crime had so destroyed his consciousness of right and wrong, that when on his death-bed he thought that he had done everything which was acceptable to God. That is a strong fact, showing how persistence in wrong-doing blunts the conscience, and that men sunk in crime are not always subject to feelings of remorse. (Hear, hear.)

Rev. DAVID GREIG.—I perfectly agree with the paper which has been read. It seems to me that it is an especially able and excellent paper, and one which is very useful and very needful in these times. What strikes me as one of its chief excellencies is the symmetry with which Dr. Irons has arranged the different points of his argument. They are so beautifully con-

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nected together, and the whole theory which he has prepared so exactly covers the facts, that I do not know that there is any particular subject on which I have to remark. There is one point on which Dr. Irons has been criticised, and I must say that up to very recently I agreed with the criticism, but I have been led somewhat to alter my view. The sentence specially criticised was, that "To affirm itself the mind needs no other principle than itself." It was objected to that, that the mind cannot affirm itself without it comes into contact with some object of the external world. Now that is, no doubt, the great principle of modern metaphysical speculation. Descartes, who introduced modern philosophy, based it on consciousness ; then Locke made a step downwards, as I should say, and taught that all knowledge arose from sensation. Kant took this position. He said Locke is wrong in saying all knowledge is from the senses. It is true that the senses, he said, give the occasion for our knowledge, but part comes from the mind itself. That position of Kant was ignored by Sir W. Hamilton, and I believe that is the position now generally adopted, although I have recently had reason to doubt its correctness ; and I think that modern philosophy has done wrong in departing from the middle-age position which Dr. Irons has brought to bear in his paper to-night. There are a great many facts which have led me recently to doubt the correctness of our modern position ; for I cannot explain the fact of consciousness, of what I would call empirical consciousness, without supposing a higher consciousness. (Hear, hear.) Knowledge itself is something different from sensation, and sensation as we know belongs to empirical consciousness. There are a great many facts in our everyday life which seem to point the same way. What I mean by empirical consciousness is the consciousness we have while we are awake. But what becomes of the mind when we sleep ? And there are not only the phenomena of sleep, but a great many curious phenomena connected with dreaming, madness, and somnambulism. There are a great many curious phenomena which are not fully explained which seem to point to the same thing ; and not only that, but it is an undoubted fact that there is what we call latent knowledge. We find very common instances of it in the association of ideas. There are laws by which ideas succeed each other in the mind. Now it sometimes happens that two of these ideas, which appear wholly disconnected, succeed each other immediately. What is the link between them ? You must go to some other consciousness for it. I may say that my view is not at all matured on the subject. At first the position which Sir Wm. Hamilton held seemed to me to be reasonable, but recently I have come to doubt it. Then how come we by the previous thought that there should be a cause ? Some who have criticised that seem to be under the impression that our notion of causality is derived from our consciousness of our own actions, but I very much doubt whether that covers the notion of causality. I think there is something more——

Mr. Row.—I said that the consciousness of "I, myself" was the cause of action.

Mr. Greig.—I question very much whether that would explain it.

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When we speak of the principles of causality, we do not mean that every event has a cause, but that every event *must have* a cause. Where do you get the "must"? (Applause.) It seems to me to be implied in this question. Suppose the experience of various phenomena suggested the general idea of a cause, how come we by the previous thought that there should be a cause? It was said that the word prior is understood, but there are two meanings in which you may take the word "prior"; prior in time or prior in logic. You suppose that there is a notion of causality before a previous thought. Here, "that there should be a cause," means not previous in time but in logic, and that would bring out the point I was speaking of, namely, How do you get this notion of causality? You cannot draw it out by empirical consciousness. It would seem to point to the higher consciousness of which I was speaking; but, as I have said, my views are not yet matured upon that point. (Applause.)

Dr. Edward Haughton.—May I ask if it is the intention of Dr. Irons in his second paper to take any notice of the philosophy of Dr. Hartley, who held similar views on necessity to those Dr. Irons has referred to in the first part? Dr. Hartley was a voluminous and an able writer, although he is now somewhat out of date, particularly in physiology, yet being a contemporary of Locke, and holding, to a certain extent, a similarity of views, he received more or less support from Locke. It would, therefore, be very desirable if some notice could be taken of his system of philosophy, more especially as he was not a Pantheist but a religious and pious man.

Mr. Reddie.—I think we should allow Dr. Irons to pursue his own course; but perhaps Dr. Haughton would himself favour us with a paper upon the philosophy to which he has referred.

Dr. Haughton.—I only asked for information. I am not aware whether he is referred to or not, but I trust he will not be overlooked or thought unworthy of notice, though I am far from holding his opinions.

The Chairman.—The usual custom is for the Chairman to express his own views on the paper, and as it were in some degree to sum up the arguments before the writer replies, in order that he may have a full opportunity of replying to everything that has been said. I cannot venture to criticise in any way a paper in which I so thoroughly agree; at the same time I think that we are very much indebted to Dr. Rigg for so powerfully putting forward his reasons for considering that Dr. Irons is out of date in his metaphysics. A great deal, however, may be said in his favour, and I cannot help feeling that one great merit among others of this paper is the mode in which Dr. Irons has treated the subject. There is a very vague idea—I call it a vague one, but it is an idea very prevalent, owing to the superficial thoughts of people in every branch of philosophy,—that there is a much more certain degree of evidence to be acquired in what is called physical philosophy (I mean phenomena and the causes of the phenomena of the material world)—that there is much surer and more certain demonstration to be obtained on such subjects, than upon such a question as Dr. Irons has brought before us, that of moral responsibility. I cannot but feel that Dr.

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Irons has treated this subject precisely in the same way as that by means of which great discoveries have been made of the laws and phenomena of the material world. He has treated the subject in such a way as to show us that there is precisely the same amount of evidence—I do not know that he does not go still further and demonstrate that there is much higher evidence—for the belief in human responsibility that there is for our belief in any of the laws which regulate physical matter. A great deal of the vague thought to which I have alluded arises from men only making themselves acquainted with natural philosophy through the authority of others, instead of investigating things for themselves. They take it for granted that a man has obtained a degree of evidence which is not to be found in any science whatever; but the same uncertainties, the same doubts, the same difficulties which Dr. Irons has just set before us, in respect to moral philosophy, exist also in respect to what is termed natural philosophy. There is the same difficulty in defining, and the same difficulty in getting a clear idea; in fact, there is as much difficulty in defining what is matter, or what is force, as there is in defining what is virtue, what is good, or what is evil. But the reason why we have made advances in natural philosophy is because we have taken up the subjects, and realized them so as to get, as it were, the main facts they present, leaving out of consideration anomalous facts, and being satisfied with what I may call an imperfect metaphysical acquaintance with the subject; and, in order to make a similar advance in moral philosophy, you must pursue the same way at first, for the purpose of getting a standing ground for human thought and human argument. I therefore think we are very much indebted to Dr. Irons for the philosophical manner in which he has dealt with the subject. The true method of induction is to take nothing for granted from mere authority, but to reason accurately and simply on phenomena, as the nature of those phenomena are discovered by us. There is one thing which, I think, threw considerable light on the subject, and which Mr. Greig brought forward in defence of Dr. Irons's view. I cannot but conceive that there is such a thing as moral instinct, as well as that vast and wonderful power termed instinct, accorded to the lower animals of creation. I believe that we possess far more natural instinct than is generally admitted, but I do not believe that this instinct is concerned simply with man's physical powers. Who can understand the wonderful mathematical instinct which enables the bee to make its cell in so marvellous a manner? Who can understand one-thousandth part of the wonderful instinct accorded to the brute creation? We find, practically, man showing that he possesses some of these instincts, though to a certain extent overborne and depressed, but occasionally heightened by the exercise of his natural reason. I cannot conceive but that man, also, in a state of perfectibility, was endowed with moral instincts. (Hear, hear.) All these subjects, when gone into, bring forward one great and valuable fact, which is the fact of what I call the natural history of man's moral nature, which cannot be denied. If you enter into this subject philosophically, you build up an ideal moral perfection. You have first to build up a mind of moral character such as

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would exist in a normal condition. But when you go out among your fellow men, or look into your own moral nature, you find that you have to deal with a diseased moral state, which state of disease exists more or less in every individual. If a physiologist were engaged in constructing the physiology of a man, such as he would be in a state of nature, he would take only those organs which he found to be in a perfect state of health; and from those organs which are in a perfect state of health he will tell us what is the normal condition of the various organizations of the human body, and inform us what is their normal use. But it is this knowledge of the normal condition of the human body which enables him to detect what is abnormal; and so, the reasons and conclusions at which Dr. Irons has arrived here, having reference to the normal state of moral consciousness, the normal state of man's responsibility, and the feeling that he is under,—that knowledge of man's normal consciousness and normal condition with respect to his moral responsibility, together with the knowledge of what he is,—leads him at once to discover the great prevalence of an abnormal condition of mankind; showing that we are not in that moral condition of perfection now in which we were created, and therefore that man must be admitted to be a moral agent in a fallen state, and that it requires something to raise him up from it. (Applause.)

Dr. Irons.—It is very gratifying to me to find so large an assembly gathered together to listen to anything so difficult, and perhaps so obscure, as the subject which I have submitted to you; and therefore I will best show you my respect by not detaining you too long in my closing remarks, I am very much obliged to those gentlemen who have criticised my paper. I only wish that those who differ more widely from its conclusion, had also expressed their opinions. Great pains were taken to inform those who take a hostile view of our position, that they would be welcome to be present to-night, not only as listeners but speakers. But if they have presented themselves, at all events they have not enlightened us! I must thank Dr. Rigg for calling my attention to a passage which, perhaps, might be improved verbally, but which has been sufficiently vindicated by Mr. Greig. I do not think that Dr. Rigg could have weighed the previous passage; if he had, he would have seen what I said with respect to the real nature of an agent, and would hardly have made the criticism which he did. I say that those who deny their moral agency take it for granted that the agent is nothing. To deny the position which I have laid down—whether something in human action is really determined upon by a man—they must say, "I act on him,"—that is, on nothing, which, of course, is an absurdity. All that I assume here is, that this conscious being is a being, and is not merely beholden to the phenomena for his existence. The mistake Dr. Rigg fell into was corrected by Mr. Greig, who pointed out that although historically man may not be anterior to his own action, yet we must logically regard him as prior to phenomena. With reference to what Dr. Haughton has suggested, I would point out to him the utter impossibility, within the limits of such a discussion as this, to take anything like even a general view of the opinions of the

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metaphysical writers of the last century or the century before. All that I can do is to give an outline of the subject itself, without referring to the names of authors. In the present paper I was absolutely obliged to do so. I have not encumbered my paper with technicalities referring to the opinions of authors whose names are now scarcely mentioned except the first two or three. I have confined myself to pure abstract reasoning, or at least I intended to do so as far as the subject admits of it; and I have merely glanced at the general views of the writers of the realistic school of philosophy, and the realistic theory, using those terms merely in an historical sense because we have nothing to do with these views here, dealing only as I have done with facts. Dr. Rigg said one thing, which, if it had been said when I was much younger, I might have smarted under, for he seemed to think that I had forgotten my metaphysics. One thing I can say, namely, that I have never changed my metaphysics. I have seen in this room to-night an old friend with whom I talked metaphysics at college, and I think that he would testify that I am very much the same as I was. With respect to those who have been invited here this evening, I most earnestly repeat the invitation when the second part of the subject is treated; and I only hope that in the meantime they will read carefully for themselves what I have written. I shall do my best to prepare by the 1st of March the second paper, which will be somewhat more historical, and perhaps not so dry as the present; and those two papers will lead me up to the more purely religious portion of the subject. (Applause.)

The meeting was then adjourned.

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ORDINARY MEETING, February 15, 1869.

The Rev. Walter Mitchell, M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

Members :—H. T. Vanner, Esq., 27, Darnley Crescent, Hackney ; John S. Barker, Esq., Bramwell Grange, near Stockport.

Associates, 1st Class :—John Henderson, Esq., Merchant, Glasgow ; Samuel Finley, Esq., Montreal, Canada.

In the absence of the Author, the Honorary Secretary read the following Paper :—

ON THE DOCTRINE OF CREATION ACCORDING TO DARWIN, AGASSIZ, AND MOSES. *By the Rev.* John Kirk, *Professor of Practical Theology in the Evangelical Union Academy, Glasgow ; Author of "The Age of Man Geologically considered in its bearing on the Truths of the Bible," &c., &c. ; Mem. Vict. Inst.*

IT is not wonderful that men should search after the origin of earthly things, though it does seem wonderful that any should fancy that they find that origin in a *nebula*. We are accustomed to say of certain matters that they "end in smoke" ; and perhaps that which has such an ending may have had an equally intangible beginning; but that a self-condensing gas should prove to have been the prime source of all which goes to make up this wondrous world, draws, we confess, too heavily on our believing powers. Such, however, is the *logical terminus* of all the evolutionary schemes of creation. We are led by them, if we are disposed to go "all the way," to imagine that all things and all beings, in the terrestrial universe at least, are but the results of self-moving "gemmules" from a luminous mist, rather than the works of an Almighty Maker.

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And yet, absurd though they seem, it is, no doubt, important that we should frankly face all such notions, and put the reasonings by which men seek to sustain them to the test of sound and serious argument. To do so, we cannot rest satisfied with the teachings of what is frequently called Science, to the exclusion of that which is regarded as Philosophy. It is one of the grand delusions of a somewhat popular style of thought at the present day, that a man needs only to know "phenomena" in order to be truly intelligent in relation to nature. But the philosophy which so confines itself can have nothing to do with the origin and causes of things; neither can it throw the very least light on the nature of the changes which they undergo. The lad who marvelled that the large wheel of a coach did not run over the little one, was occupied with "phenomena," but showed true humanity in wondering after their *relations*. We must understand these relations if we would satisfy the intellect, and to do so really, we must reason about that which has all its existence in thought, as well as observe that which has its being in the material only.

It is well, therefore, in approaching a controverted scientific subject like that now before us, to note, at the outset, the fundamental principles which it involves. If our beliefs are at antipodes as to these, it is not probable that we shall reach anything like harmony, however long we may protract our discussions.

By that which is properly metaphysical reasoning, we learn that a *form* in itself is nothing. It is only a mode of existence in that substance whose form it is for the moment. When men speak of "forms" apart from individual things or beings, it should be borne in mind that they speak of that which has no existence in nature. There are material substances, each of which has its ever-changing form; but these substances are things or beings, not forms.

A *type* in itself is nothing. It is not even a mode of existence in anything other than the mind in which it may perhaps be an idea for the time. There is nothing in nature corresponding to the word "type" as used by the naturalist. When, therefore, men speak of "types" or of "typical forms," they speak of that which really *is not*, except as a state of their own imaginations.

Life, in itself, has no separate existence, any more than form or type. It is only a state of existence in a substance which, for the time being, is alive. It is, I believe, only a state of movement. That which we call "life" in a material substance is *motion, and nothing more*. Should we use a microscope power-

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ful enough to enable us to see those movements in certain particles of the living blood which are now called "protoplasm," and set down as "the physical basis of life"—when we perceive the wavelets within these living particles, what do we observe but *movement?* By a great magnifying power we can trace the motion into portions of the material which is alive, far beyond the point of smallness reached by the naked eye; but we see nothing then different from the larger wavelets of the great stream which passes through the heart itself. We are not one whit nearer the discovery of anything else than motion, when we have got to the so-called "protoplasm" and its movements, than when we look at the entire man as he walks before us.

Force, unless the word is understood as identical with *motion,* has, to my mind, no proper place in material changes strictly so called. To say that any portion of material substance has great force, is only to say in truth that it moves in a certain way, unless we mean to include more than matter in the statement. By means of those senses through which we perceive changes in material objects, we can perceive movement; but we can neither see, nor hear, nor touch, nor taste, nor smell force, in the sense of that which produces movement. When Professor Huxley turns his microscope on the centre of a nettle spine, he sees no *force*—he sees movement *only.* He calls the pulsating matter the protoplasm of the nettle; but it is only matter in motion and nothing more. The moment any one speaks of true force he leaves the strictly material which may be *seen,* and turns, not his eyes, but his reason to another province of being.

A *law* has no existence other than as an idea or state of the mind. There is no such substance as a law; nor is there any such quality of any substance. The word expresses no reality in nature except a state of thought, whether we look to laws written or unwritten. Written laws are ideas expressed or signified; unwritten laws are ideas unexpressed or unsignified. When any one speaks of changes effected in nature by "laws impressed on matter,"* his words have no thinkable meaning. Matter has no ideas, and therefore can have no laws so impressed on it as to affect it in any way. What are called "the immutable laws of the material universe" are nothing in reality but ideas in the minds of those who speak of them; and of all mutable things these ideas are among the most mutable. Of all confused and contradictory things, they are the most confused and self-destructive. What, for ex-

* Darwin's *Origin of Species,* p. 576, 1866.

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ample, are Darwin's "laws of variation" but just Darwin's ideas? And, as we shall see, there is nothing among all the changing thoughts of humanity more self-contradictory than these same ideas. What are Sir Charles Lyell's laws impressed on the materials out of which the earth itself is constructed, but just the ideas of that very amiable geologist? And when we compare the first and the last of the ten editions of his "Principles," how perfectly does one set of these ideas destroy the other! But it is the same all through the wide world of what are called "laws of nature." How marvellous that men should mistake their own ever-changing notions for Divine Rule!

Uniformity represents an idea only: and when the term is used as expressive of the relation of one change to another in nature, its meaning is loose in the extreme. To a child at a certain stage of his knowledge any man is his father—a little further on, and only some men call forth his exclamation of "papa!"—by-and-by only one man does so. To an untutored observer all green things growing on the surface of a grassy field are simply "grass"—when that same mind has learned a little more, there are some green things that are "weeds," and not grass—to that mind, when highly educated botanically, there appears a vast variety of "plants" in that field. But to the most cultivated botanist on earth there is a variety of constantly changing forms among these plants almost infinitely beyond his utmost powers of discrimination. No two blades are exactly alike, nor is one bud or seed produced with precisely the same germinal character as another. What then does "uniformity" mean when applied to such changes as issue in that variety? Only something very like that which makes a young child call every man his father. We have the faculty of observing certain points in nature which have a certain degree of sameness in their relation to each other; and the faculty is of great practical value; but it falls immeasurably short of what those imagine who speak of *exactness* in human thought. We shall see the bearing of such remarks as these when we direct our attention to the much-agitated questions that relate to the likenesses and diversities which give rise to such abstractions as those expressed by "species" and such-like terms.

In dealing, then, abstractly with forms, and types, and laws of life, it is necessary to remember that we are dealing with states of mind only. Our field is one of thoughts rather than of things. In this field all about which we reason is constantly and strangely changing, for all consists of the ever-fluctuating notions of men. Certain of these notions are no

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doubt called "exact science"; but there is nothing less exact in the universe. Some of these notions are held to be "settled points" in science; but there is nothing less settled on earth or anywhere else. The "form" called a "variety" to-day is a "species" to-morrow, perhaps a "genus" next day, not unlikely something higher next, and maybe it is back to a "variety" again in a month! So a fundamental law of creation last year is a myth in the present! This would be wonderful if it occurred among the realities of nature, but need not surprise us in the states of a strongly speculative mind.

This ever-fluctuating thought, too, has relation to a material world of perpetual change. That natural history, indeed, into the essential principles of which the scientific and philosophic inquirer is ever searching, is proceeding in a manner calculated profoundly to increase the fluctuations of his thinkings. There is truly immeasurable variety—incessant change. I believe we are right when we say that no two substances in the universe have exactly the same form. Neither has the same substance had the same form twice. Neither does any substance retain the same form during two seconds of its existence. The rocks composing "the everlasting hills" themselves are undergoing incessant metamorphosis—perpetual change. That which is dead and decaying is changing as truly as that which is living and in a state of growth. When we speak of "permanent" forms or types of either the living or the dead in nature, we should remember that we are speaking of ideas only—not of actual things or beings in the natural world.

It is because of considerations like these that we are disposed to discuss certain notions as to the origin of life in a somewhat metaphysical rather than in a purely physical manner in this paper. Our aim really is to test the consistency of *thought*, rather than to follow the mere detail of fact on which that thought is so far founded. We are mistaken if in the end this mode of dealing with fanciful theories will not be found to be the most ready and efficient for the common mind. Ordinary inquirers get bewildered amid millions of facts thrown upon them as it were in cartloads, while they can trace the truth, or detect the fallacy of principles if these are fairly placed in comparison.

And yet we must remember that there is a field of fact on which the ever-fluctuating spirit broods, and in which it searches for those thoughts which constitute truth, from their being in due correspondence with the actual state of things. Among the myriads of fancies there are myriads of true ideas. The grand object of science is to gather and treasure up these. In doing so it must sift out from among heaps of chaff the true

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grains of reality. In order to do this it must keep close to the concrete in arguing out the abstract.

But let us take an illustration of this from that which will, at the same time, be an important step in our present inquiry. We lay hold of an individual living substance. There it is, and ideas associated with it are soon occupying our minds. That individual had a parent substance, and in thought we see that. It will itself produce, we may safely believe, as it has been produced. Let us say that it is a sapling, and grew from a seed which was the produce of a former tree. We need not go further back, at present, but rather go forward, keeping strictly in view the plant we have in hand. This, we shall say, will become a stately oak and produce acorns, which will in their turn grow into oaks and produce acorns too. Or let our example be an animal growing from an embryo produced by a former animal, and ere long to be the parent of another embryo, or of many embryos, that will become animals and produce other embryos in the chain of living substances, on one link of which we have fastened for our present purpose. Here then, we have a substance, and not an abstraction; but we are in search of abstractions such as will stand in some true relation to this and all kindred beings in their life-changes. We are in search of an idea, or ideas, that will accord with that change from which these changes started as from their true original, and from which the constantly-changing forms of those living substances took their character. *What shall be the order of our inquiry?*

A *germ* is as truly a *terminus* as it is an origin. An acorn is a *fruit* as truly as it is a seed. If we look strictly at the chain of changes in the order of nature, the aspect in which we see the germ as a fruit is before the seed aspect, not after it. There is no seed which is not the result of maturity in that whose seed it is. If we begin at our present stand-point and go back along the chain of changes that have taken place in the succession of any living substance we can reach no germ which is not the result of matured growth, any more than we can reach a matured organism which has not followed in the wake of a germ. What good reason can any one give why we should fancy that the origin of such a succession must be in the seed and not in the matured individual which produced, or so to speak, terminated in that seed? Why should men's minds gather round *embryos* when they are in search of the origin of beings? I can think of no satisfactory reply to such questions.

But these give rise to other questions of similar import. It is true that the seed is smaller than the tree—the embryo is

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smaller than the matured animal; but on what ground do we reason that small things are the originals of larger things? Are not these small things brought forth of larger? Beyond doubt they are. If to give being to individual living objects be to give origin, then it is the large that give origin to the small, not the small that originate the greater. Is there not a radical mistake in the notion of origin that seeks for it among infinitesimals? When men insist on finding the true idea of the origin of things by means of the microscope, do they not invert the order of a sound philosophy? I see no way of escaping the conclusion that they do so. If by the most powerful combination of light and lenses that could be invented we should discover the minutest germ that human eyesight can rationally hope to see, that germ would still be the product of a larger parent; and hence the discovery would still leave the order of nature, so far as known, to be that of the larger giving origin to the smaller—not the smaller giving origin to the larger.

Moreover, it is not the germ that gives *character* to the matured organism—it is confessedly the matured organism that gives character to the germ. That character is *developed merely*, as the growth of the individual goes on. The "varieties," of which so much is made in this controversy, are accounted for, by Darwin himself, chiefly not by their being traced to their embryos, but beyond these to affections of the matured organs of reproduction. It is by these affections of the matured organs that he regards these varieties as originating in the germ or embryo.* This is, beyond question, finding the origin of character in the parent, and not in the embryo. Why then should originals be sought for in embryonic littleness and not in matured greatness?

It is quite true that the individual, *when once originated*, is developed from small to great; but philosophy is not, in this matter, in search of growth or development, but of *origin*. Whether we are bent on finding the true idea as to the beginning of individuals, or of kinds, we seem to be carried beyond germs and into parents. Once having got the germs, we have no difficulty as to their growth. The character of the germ determining all the great features of the individual to be developed from it, but not determining the character of the next germ in succession, we are driven away from germs in looking for origin. The reproductive organs being affected, not by germinal character, but by external conditions acting upon them, and only through them on the germ, compels us to

* See *Origin of Species*, p. 8, 1866.

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seek the first link in the chain of being in the mature producer, and not in the germinal or embryonic product. What will a philosopher of the popular school say to this?

Here, however, we come somewhat more directly on the ideas of Darwin. His theory of origin, which he calls "Pangenesis," is founded (perhaps to him unconsciously, but really founded) on that of the matured organism originating the germ and giving it all its character. His ideas are inconsistent with the germ's originating or giving character to the matured being. He puts his theory himself in these words:— "The whole organization," he says, "in the sense of every separate atom or unit, reproduces itself." The ovule or seed, under this notion, consists of multitudinous gemmules "thrown off from each separate atom of the organism."* We shall see the inherent absurdity of this theory afterwards; meanwhile, it is clear that it proceeds upon the principle that the germ receives its being and character entirely from the matured organism, and is inconsistent with any thought of the germ giving origin or character to the matured being. It is not possible on such a theory to follow the chain of things logically backward to a real origin which shall not be a parent rather than a germ. This, moreover, is in perfect accordance with Nature's own order. However inconsistent, Darwin is right so far here.

But we come now to another of this great naturalist's ideas of origin. We may quote the whole passage, in which it is most clearly expressed. He says:—

> It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the branches, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being growth with reproduction; inheritance which is almost implied by reproduction; variability from the indirect and direct actions of the external conditions of life, and from use and disuse; a ratio of increase so high as to lead to a struggle for life, and as a consequence, to natural selection, entailing divergence of character and the extinction of less-improved forms. Thus from the war of nature, from famine and death, the most exalted object that we are capable of conceiving, namely, the production of the higher animals, directly follows. There is a grandeur in this view of life, with its several powers having been originally breathed, by the Creator, into

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* *The Variation of Animals and Plants under Domestication*, p. 358, 1868.

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a few forms, or into one ; and that while this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning, endless forms most beautiful and most wonderful have been, and are being evolved.*

It is not easy to see what Darwin here means by "a few forms," or by "one." If he mean anything real, he must speak of substances—actual living creatures. If he does mean actual plants or animals, or a plant or an animal, what kind of a plant or animal was this into which the Creator breathed originally these "several powers"? It is very clear that it must have been a parent plant or a parent animal. From it, according to Pangenesis, innumerable "gemmules" must have gone off to form the first seed or egg, which it produced "after its kind." But what must that "kind" have been? Darwin says it was "simple"! Pangenesis insists that gemmules of all in a germ must have been either in the parent of that germ, or in some of the progenitors of that parent; and so atoms of all that belongs to all that have come, or will yet come, from this original "form," must have been there! If this should be admitted as among the possibilities of fancy, how then could this "form" be *simple?*

But we are no less at a loss with another element in this theory of creation. There are "several powers" that are "breathed" into this inexplicable creature that formed the parent of all else. What does this mean? We can fancy motion as the result of breathing; and if any one chooses to call this motion "force," I have no very strong objection to the word, for it is still understood as only motion. But when a substance (shall we say a minute jelly-fish?) is said to be "breathed into," and thereby rendered capable of exerting such "powers" as have produced all the variety of living Nature, I confess to a feeling of bamboozlement. If we must accept Pangenesis, with its myriad atoms, each capable of the amazing power (for an atom!) of throwing off ever so many more atoms or gemmules, but, after all, go back to the Creator's breathing powers into organized beings, rendering the first capable of creating all the rest, are we not indulging in very incoherent dreams? I can easily understand what is meant by God's giving that movement which we call life, under the expressive figure of breathing into objects otherwise stagnant; but it is quite a different thing to understand His breathing into a simple substance so as to give it the power of transforming itself into all the varieties of the living world. To give movement, and to give power to regulate and sustain movement, constitute the subjects of two most distinct ideas. To

* *Origin of Species*, p. 577.

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give such movement as even a cell with life possesses, and to give such powers as could regulate and increase that movement so as to issue in the immense results that form the subject-matter of the natural history of earth, are thoughts almost infinitely at opposites. I feel, indeed, as if it were hard to believe that Darwin *thought* what he wrote when he penned the words on which we are remarking.

This appears all the more difficult of belief when we turn to his ideas at another point. He says,—"Some authors believe it to be as much the function of the reproductive system to produce individual differences, or very slight deviations of structure, as to make the child like its parents." This Darwin proceeds to modify, and says "that the reproductive system is eminently susceptible to changes in the conditions of life; and to this system being functionally disturbed in the parents I chiefly attribute the varying or plastic conditions of the offspring."* Here Darwin represents "some authors" as believing that which is indeed the natural result of his own theory of creation. If a parent creature had certain powers breathed into it, such as could regulate and determine future varieties, then it must be the function of the reproductive system in that creature to produce differences of all sorts. But this is just what he proceeds to disprove! It is not by the powers breathed into the producer, but by the functional disturbance of the reproductive system, and that through means external to the creature altogether, that the varieties are caused! Elsewhere he speaks of the effect produced on the growing individual by external circumstances; but when we carefully follow out his ideas, it is by the effect of those circumstances on the reproductive system, and through that on inheritance, that these circumstances have any influence in giving rise to variations. This throws us back again on the theory of Pangenesis.

Observe Darwin's own illustration of the working of this imaginary law. He says,—"If one of the simplest Protozoa be formed, as it appears under the microscope, of a small mass of homogeneous gelatinous matter, a minute atom thrown off from any part and nourished under favourable circumstances would naturally reproduce the whole; but if the upper and lower surfaces were to differ in texture from the central portion, then all three parts would have to throw off atoms or gemmules, which when aggregated by natural affinity would form either buds or the sexual elements."† In what way could external conditions, then, account for variations in the forms

* *Origin of Species*, pp. 157, 158.
† *Variation of Plants, &c.*, vol. ii. p. 376.

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of life? If the "form" which was first created was like the first example here supposed, and hence "simple," by what conceivable condition could it be made to give origin to the second "form"? That requires three sorts of "atoms," but this has only one sort. We could hold to this pangenesis only by believing that the first forms, instead of being simple, were infinitely complex!

But let us take another of his illustrations. He says,—"I presume that no physiologist doubts that, for instance, each bone-corpuscle of the finger differs from the corresponding corpuscle in the corresponding joint of the toe; and there can hardly be a doubt that even those on the corresponding sides of the body differ, though almost identical in nature. This near approach to identity is curiously shown in many diseases in which the same exact points on both sides of the body are similarly affected."* It is here very evident that there is one great truth which Darwin overlooks in the construction of his theory. In carrying out his idea of innumerable atoms such as would fly, each to its respective bone or part of a bone, or any other part of the material body, he speaks of the smallness of the atoms of the virus of small-pox that convey the disease, and of the small portion of diseased mucus from a plague-stricken ox, which is sufficient to corrupt the whole mass of a healthy animal when introduced into its blood; and he says, —"The organic particles with which the wind is tainted over miles of space by certain offensive animals must be infinitely minute and numerous, yet they strongly affect the olfactory nerves."† But there are no such particles, any more than there are "organic particles" in the sounds that affect the auditory nerves. He is dreaming of the old notion that led men to calculate all the "imponderables;" such as how light a bushel of smell must be when a rose could give off as much as would fill and refill a large hall with that material for weeks or months together! He forgets that all such notions are banished from tolerably informed minds, and that smells, like sounds, consist of movements only. What is necessary but a movement of a peculiar kind given to the particles of the blood, or to the substance of the sympathetic nerves of the living body, in order to the plague itself? The electric shock we now know does not discharge particles of some peculiar substance called "the fluid of electricity" through that body which is rendered a lifeless mass by it in less than a second of time. It communicates only such a motion as absorbs that other motion which we call Life, and leaves that stagnation which we call Death. But

* *Var. of Plants, &c.*, vol. ii. p. 369. † Ibid. vol. ii. p. 03.

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Mr. Darwin, apparently, does not see this; and hence his resort to infinitely numerous atoms, together with all the inconsistency into which these lead him.

When we follow this naturalist into the region of true natural history we find that his notions lack evidence, as they lack coherence when we compare them among themselves. In doing so it is necessary to keep in mind that it is not the mere meaning of the word "species" after which Darwin is really in search. Neither is it the mere development of one species from another, when he has determined that "species" and "variety" are identical in nature. In order to discover anything to the purpose of his theory, he must point out some such way back in the history of actual living creatures as can truthfully enable us to connect them (through natural generation) with similar creatures that lived in other ages; so that, comparing these two sets of beings, we shall have proof that there has been an advance in the scale of life somewhat like that by which an ape would prove the progenitor of a man, or, if you will, that by which a lowly savage would prove to have been the ancestor of the highly endowed among men at the present time.

Mr. Darwin (we may say of necessity) appeals to geology in favour of his system; and here too he finds "the most obvious and serious objections" to his theory.* But I humbly think that he misses that point of truth recorded by the rocks which fatally affects that theory. He dwells upon the "imperfections of the geological records," as accounting for the absence of "intermediate forms." But that merely negative matter would be no objection at all if we had evidence of *that gradation in any one form* which is really essential to the truthfulness of evolutionary ideas. For example, if the most "unequivocally ancient" of human remains indicated such a type as that from which, in the course of countless ages, man might have been improved up to his present form, we should care very little for "intermediate links." But as Sir Charles Lyell so candidly tells us, the most ancient human skull discovered, belonging, according to most geologists, to long-past ages, is equal to the average of the best-developed variety of man now existing. That skull proves that man has neither grown stronger in muscle, nor better in brain, during all those ages; and indicates that, if anything, he has degenerated in physical development if not in intellectual also.† Then the same thing is true of all other forms as it is of that of man. To take the eozoön itself, the earliest of all discovered life among foraminifers, it is a giant, and of the grandest character among its kind. So is it

* *Origin of Species*, p. 340.

† See *Antiquity of Man*, p. 89, 1863.

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with gigantic but extinct species in general. "Intermediate forms," if discovered in ever so great an abundance, go for nothing, so long as the most ancient found are as highly developed as those now living in the same circumstances.

Even in the recent field of domestication, of which Mr. Darwin makes so much, it is highly questionable whether "improvement," in the sense of increased usefulness to man, is not degeneration in the sense of Nature. It is beyond question that a great many of what are called "improved breeds" are only helpless monstrosities apart from excessive human care. It is unphilosophical in the extreme to regard such monstrosities as developments of the higher from the lower in Nature's sense. There is, no doubt, variation to the utmost, but it is not variation this theory requires—it is development of higher from lower forms. And this is just the idea which all Nature's records refuse to sanction.

The lapse of time does not aid the theory in the very slightest degree. If you could prove that an eternity had fled since the first man whose skull has turned up was a living inhabitant of earth, it would only make the case so much the worse for evolution, if that skull is as fully developed as the average of skulls are now. So if you prove that in a few years long-horned oxen have been changed into a polled breed, the shortness of the time proves no more than its length, unless the polled, for Nature's use, are superior to the long-horned. There must be, in the great sum of change, evidence of such an advance as that by which, through slow degrees, the first "few simple forms" have improved up to that of man. But such evidence is utterly wanting.

When we estimate fairly the amount of Darwin's teaching, it is comprised within very narrow limits. He, no doubt, greatly reduces the number of imaginary "species," and correspondingly increases that of "varieties." If any one should take it into his head to count every variety of pigeons, for example, a distinct species having its representative, not in the common root of *Columba livia*, but in a special creation of its own, such a fancy would be effectually demolished by Darwin's reasoning. So, probably, it would happen with a similar fancy in relation to dogs. If any one should insist that each variety of elephants had its separate creation, then our author would probably refute him thoroughly. If we regard the multitude of so-called "species" to which this sifting process would apply, the sweep of the system of thought wrought out by Darwin is very wide; but if we regard the system itself, it lies, as it were, in a nutshell. It means only that varieties have been in many cases mistaken for true species.

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And yet Darwin's system is of no small value, so far as it truthfully goes. We feel ourselves irresistibly drawn by it greatly nearer to the comprehensive statements of Sacred Scripture, in which the species, or "kinds," are placed before us as at first less numerous than, but for Darwin's reasonings, we should be tempted to regard them in reality. He narrows, beyond doubt, the original field of creation, as that is contended for by naturalists of an opposite school; and so far he does real, though, it would seem, unconscious, service to the Bible.

But when we follow this naturalist on to the point at which he not only lessens the vast number of species, but proceeds to establish the doctrine of an all but universal evolution, we need have no difficulty in perceiving his utter lack of evidence. There is no such thing as a fragment of proof such as would show improvement of form. On the contrary, there is only too strong evidence of the opposite, especially so far as the nations of men are concerned. What is wanted, as we have said, is progression in "kinds"—shell-fish, if you will, improving into higher shell-fish—not dwindling and dying out, but rising to higher forms of molluscous being. There is the chalk of what geologists have gloried in as the *Cretaceous Period*—placing it back ever so many ages—going on now at the bottom of the North Sea; and the chalk-forming creatures exactly of the same standing in nature as they ever were.* Is this evolution? Assuredly it is not. If we look to apes, how is it that there is just as little sign of evolution among them as there is in the lowest of creation? It is not the silly talk in which men describe, in fancy, all the process by which an ape becomes a man; it is some sign of such an improvement actually going on among the simian race that we must seek. We seek in vain. But enough, for the present, on the ideas of Darwin.

I am endeavouring to keep closely in view that we are at present dealing with ideas rather than with things. As we have seen, "forms," "types," "force," "life," "law," and all the other words that go to make up the vocabulary of abstract thinking, are representative of states of mind only. "Varieties," "species," "genera," are all expressive of ideas, and nothing more. The truth of this comes very strongly upon us when we pass from one great school of thought to another and opposite school. "Forms" have no longer the same significance—"types" mean totally different abstractions,—"Life," with all its "forces," "laws," "uni-

* See Dr. Carpenter's Report, given in *Scientific Opinion*, vol. i. p. 231.

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formities," and "designs," is utterly diverse from what it was among the ideas which we have left. This is a matter of very great moment to the inquirer after truth. It reminds him that he ought never to confound ideas with things. He may take all the help that ideas can render; but, after all, he must seek thoughts for himself, in the way of observing Nature, and also in that of sifting most carefully the observations and reasonings of others.

When we pass from the teachings of Darwin to those of the equally celebrated Agassiz, the contrast of thought is very striking. Here "species" are no longer "improved varieties" that have diverged from each other in the course of countless ages, and in their descent from a common parentage, but "*primordial forms.*" Agassiz adopts the idea of Morton, and declares his full belief that species are thus "primordial."* "Species," he says, "are, then, distinct forms of organic life, the origin of which is lost in the primitive establishment of the state of things now existing; and varieties are such modifications of the species as may return to the typical form under temporary influences." When lecturing to his associates, on his way to Brazil, he said,—"I am often asked what is my chief aim in this expedition to South America? No doubt, in a general way, it is to collect materials for future study. But the conviction which draws me irresistibly is, that the combination of animals on this continent, where the faunæ are so characteristic and so distinct from all others, will give me the means of showing that the transmutation theory is wholly without foundation in fact."† It was the full belief of Agassiz, when he had completed his journey, that his observations had more than established this conviction. There is great vigour in the faith of this distinguished naturalist; and hence the conflict of thought between those who think with Darwin and those who think with Agassiz is real and hearty. When putting the question as to whether there is any *standard* in nature by which species may be infallibly marked off from mere varieties, he says,—"The true principle of classification exists in Nature herself, and we have only to decipher it." Then he says,—"The standard is to be found in the changes animals undergo, from their first formation in the egg to their adult condition."‡ He notices the remarkable similarity in the embryological forms of widely differing species, and the use which a Darwinian is disposed to make of it. "But," says he, "when we follow it out in the growth of the animals

* See *Types of Mankind*, p. lxxix., 1865.
† *Travels in Brazil*, p. 33, 1868. ‡ Ibid. pp. 20, 21.

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themselves, and find that, close as it is, no animal ever misses its true development, or grows to anything but what it was meant to be, we are forced to admit that the gradations which unquestionably unite all animals is an intellectual, not a material one. As the works of a human intellect are bound together by mental kinship, so are the thoughts of the Creator spiritually united."* These are very different ideas, indeed, from those of Darwin. Even as to the process of development, their ideas are wide apart. Agassiz says, that however the processes of development "may approach or even cross each other, they never end in making any living being different from the one which gave it birth, though in reaching that point it may pass through phases resembling other animals."†—"So-called varieties or breeds," he says, "far from indicating the beginning of new types, or the initiating of new species, only point out the range of flexibility in types, which in their essence are invariable."‡

It will be readily seen, from the quotations thus before us, that the ideas of Agassiz are utterly irreconcileable with those of Darwin. The latter sees the evolution of all nature's variety from atoms, or gemmules thrown off by atoms, which find their own way to their respective places in organic substances through those "several powers" that were breathed into the few original forms, or into the one original, at the beginning of life. He imagines material being to be self-moving—self-organizing—though not quite self-creating. Agassiz sees all matter only plastic in the power of an omnipresent, ever-working mind. To Darwin, matter is force; to Agassiz, mind alone is force. It is not that the two naturalists believe in the same power doing the same work, only that they differ as to the way in which it is done. "Powers," in Darwin's mind are those of material substance; in the view of Agassiz, they are those of spiritual substance. "Evolution," on the theory of Darwin, must appear the grossest absurdity to Agassiz, as it may well do to any one who looks into the real principles of life as a true philosophy reveals them.

Darwin sees no definite *idea*—indeed, no *idea whatever*—in the working out of the great natural processes. Variation with him is a matter of the purest chance, giving permanent existence to certain forms only because these happen to be the most suited to the conditions amid which the merest accident throws them! Agassiz sees a thinking mind, with a clear plan from the first, working out that plan steadily through all the history of being. He seems to have no more

* *Travels in Brazil*, pp. 22, 23.
† Ibid. p. 41.
‡ Ibid. p. 42.

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thought of Scripture than Darwin; but, deep in the foundations of his thinking, the Infinite One has such a place as constrains him ever to see that Almighty Spirit as not only the first, but the constant cause of the great harmonies of life.

Agassiz sees that this Infinite One has such a place as is inconsistent utterly with the theory of evolution. On this point he is at antipodes with Darwin. He sees *species among mankind*, as clearly defined as among any other of the genera of earth. He imagines a considerable number of creations of "first parents" for the human race, as well as for other races, each pair made suitable to a particular "province," and placed there along with suitable types of life associated with them. He says,—"The diversity among animals is a fact determined by the will of the Creator, and their geographical distribution part of the general plan which unites all organized beings into one great organic conception; whence it follows that what are called human races, down to their specialization as nations, are distinct primordial forms of the type of man."* Starting from a period when he holds that this globe was unsuited to the existence of life, he says (logically enough) that when this ceased and life began, origin by development was impossible, because there were no "ancestors" from which living creatures could be developed. Here Darwin admits the creation of "a few forms, or one," into which "several powers" were "originally breathed." But Agassiz insists on the continued action, not of these powers, in which he has no faith, but of that power which gave origin to all primordial beings. He says, "Until we have some facts to prove that the power, whatever it was, which originated the first animals, has ceased to act, I can see no reason for referring the origin of life to any other cause."† By the "origin of life" here he cannot mean the first animals created merely. He clearly means the origin of life in every individual creature. It is in such ideas we see the immense divergence of his thoughts from those of Darwin; and here, I must confess, I cordially agree with Agassiz. I am not sure about his "evidence" of a state of the earth when it was impossible for living beings of any sort to exist on it; but I am fully convinced with him that there was a time when life began, and *that He who gave it origin gives it continuity.*

But now comes the testing point in the doctrine of Agassiz, when he divides the human family into distinct species, and seeks to place his proof for this division before us. In the *Types of Mankind*, by Nott and Gliddon, from which we have

* *Types of Mankind*, p. 76. † *Travels in Brazil*, p. 43.

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already quoted, we are furnished with a chart drawn up according to instructions from Agassiz. The forms of life on earth are there placed under eight heads, and the chief types are arranged in eight columns. But, in the construction of these columns, the "facts" are handled in a manner fitted to destroy all confidence in the representations of scientific men.

Here we have Africa and its typical "negro." We should expect to find the figure of an African head placed at the top of the African column to be as near the average as that adopted in the case of the other typical creatures given in the column; but no. The very lowest specimen that could be found is exaggerated into a caricature of lowness, and given as the "type"! I have seen Charles Livingstone's photographs of Africans taken in their native wilds, and he has personally told me that they were fair average heads. They would be fair average heads among ourselves! They demonstrate that this bust published by Nott and Gliddon is a shameful misrepresentation.

If we pass from this "typical" African to the "typical" European, we find the bust of Cuvier himself given as that "type." One of the very greatest men of which any country can boast, and that, too, evidently after he had lost his teeth, so that he presents the greatest possible contrast to the "prognathous" negro, is placed in comparison with the lowest form that could be selected from among the blacks. Is this science? or is it likely to lead any one to respect the honour of scientific men? The united testimony of Dr. Livingstone and his brother, in reference to their observation of natives in Africa, is this. They say, "We have seen nothing to justify the notion that they are of a different 'breed' or 'species' from the most civilized. The African is a man with every attribute of human kind."* Nor is this a testimony in favour of a mere unsupported opinion. The figures from photographs taken in the interior,—figures of men, women, and children given with the greatest fidelity, as any one may see who compares the engravings with the photographs from which they are copied,—are the most unexceptionable evidence of the truthfulness of this testimony in favour of African manhood. If men form a set of ideas in which all Europeans are Cuviers, and all Africans are like this caricature of a negro given in Nott and Gliddon's chart, what may be expected as to the conclusions to which such notions will lead them?

But there is another way in which this chart of life may be dealt with. Under each human head is a column formed of

* *The Zambese and its Tributaries*, p. 596.

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typical animals, such as are associated with the "typical" men in their several "provinces." At the foot of that of which Cuvier is the head, is the old ox of Europe (*Bos Urus*). At the foot of that headed by the Negro is the giraffe. Could Agassiz show as clear a distinction between even the caricature of the black and the portrait of Cuvier as there is between the ox and the giraffe, there might be some reason for his suggesting that the two belonged to separate primordial forms; but, with all the flagrant unfairness of the figures chosen, he can do nothing of the kind.

What then does Agassiz teach us? He stands opposed to Darwin, as we have seen, in an extreme degree; and I humbly think that he strips that naturalist of no small amount of his fancies. In his views of the localization of forms of life, together with the multitude of facts by which he establishes these views, he seems to me to demonstrate that, from the first, its great specific distinctions were radical and determined —that each species, properly so called, was as perfect at the outset as it is now. Geologically he has an immense advantage over Darwin; and this advantage increases as discovery goes on. The oldest creatures are no longer regarded as having had simple organizations, that is, by well-informed geologists. As the abodes of living substances become more and more explored, too, the old notions of a gradation from small to great, and from low to high, are being dissolved. Agassiz speaks strongly in this line of thought. He says: "There are other animals in Brazil, low in their class to be sure, but yet very important to study embryologically, on account of their relation to extinct types. These are the sloths and armadillos—animals of insignificant size in our days, but anciently represented in gigantic proportions. The Megatherium, the Mylodon, the Megalonyx, were some of those immense mammoths. I believe that the embryonic changes of the sloths and armadillos will explain the structural relations of these huge Edentata and their connection with the present ones. South America teems with the fossil bones of these animals, which, indeed, penetrated into the northern half of the hemisphere as high up as Georgia and Kentucky, where their remains have been found."* It would be very difficult to find evidence of the evolution of greater from smaller, or of higher from lower forms, in such a field as Agassiz thus rapidly surveys. If evolution is there at all, it is of small from large, and low from high.

It is thus that the ideas of these two great men neutralize

* *Travels in Brazil*, pp. 24, 25.

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the extravagances of each, and throw out the truth between them. The careful study of both leads to the belief of neither of their systems fully; and yet it leads to the perception of that grand doctrine which may be said to find a resting-place partly in both. In their almost incredible researches, these men have each seen something true; and they have each, too, fancied something untrue; but when the chaff is blown off, and the good grain gathered, it will mingle harmoniously and yield a satisfactory faith.

And what shall that faith be? Shall it be that taught by Moses in the Book of God? It is not unfrequently said that the Bible was not meant to teach us science. Perhaps there is a sense in which the statement is true; but such is not the sense in which it is frequently used. When, for example, it is insisted that the Book of Genesis is not to be at all considered in a scientific discussion on creation, and this negation is upheld by the statement in question, it is untrue. What are those grand philosophic principles around which the labours of Darwin and Agassiz gather? They are those very principles laid down with divine simplicity and truthfulness in the Bible. Let us glance at them.

There is "the beginning:" And do not both the great naturalists before us found all their speculations on this very idea of a beginning? There, again, is the chaotic state, in which life was not;—and do not both recognize this? They at least fancy that they find "scientific" evidence of it; and, whether real or fanciful, they hold the idea as an essential part of their natural history. There, again, are the separations of the atmosphere from the watery surface, and of the dry land from the ocean; and assuredly we have principles of natural science there. More than geology, with the aid of all the other sciences involved, has yet wrought out, is thus laid down clear and full in the Bible. It is too bad to say that this is not meant to teach us natural science, when so-called science has failed to bring us near to the point of knowledge at which this Book places the humblest reader! But here comes the order of life, and vegetation covers the land. That vegetation is divided into such as propagates itself by its rootlets, and that which does so by its seed-bearing powers. It is not the seed, nor the budding rootlets that come first in order, but those plants which so propagate themselves, each "after its kind." Darwin would take this creation in a more limited sense than Agassiz; but both hold "inheritance" as of the last importance in the science of life. Both really accept this fundamental teaching of Moses, given so long before their day.

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Then come the fishes and amphibious creatures of the waters, including fowl that fly in the air as well as live on sea and land. Is not this in strictly scientific order? If Moses did not mean to teach us science, it is surely marvellous that he taught us such perfect knowledge of nature without meaning it! If unconsciously he taught that which has never been excelled by the best minds on earth, it would be miraculous indeed. Then come before us the "great whales" of our common version, but really the gigantic originals of that vast variety of large creatures which still inhabit the earth, though now reduced to narrower dimensions. In these we are presented with neither the "few forms" of Darwin, nor with the multitudinous creations of Agassiz; yet with that very golden mean in which the truth is so often found.

I confess that I feel the very gravest doubt as to whether the fundamental elements of all popular natural science are not merely the unconsciously retailed ideas of the Bible. I am not able to find evidence of a "beginning" in *geology*. The "nebular hypothesis," as it is called, is absurdity itself when tried by actual facts. The igneous condition of the interior of our globe, and its cooling down to its present state, is utterly inconsistent with the strongest geological evidence.* It does seem as if our great scientific men were deluding themselves with the idea that they have found in the records of the rocks that which they would never have dreamed but for their Bibles. These Bibles have taught them all the true doctrine of creation they yet know!

See how this is confirmed when we come to the creation of man. Here is a breathing into one form, not of "several powers," but of a *special life*. This is in perfect accordance with all that true science teaches, though not the result of unaided human inquiry such as claims the monopoly of being that science. In the lowest specimen of human kind there is a life, or movement, of spirit that is specific in the highest sense of the term—a movement which rises to the Creator Himself, and marks Him out as the object of either love or fear—a movement which has nothing analogous to it in all the rest of creation. Surely the teaching of such a truth in the creation of man is teaching the very loftiest and most trustworthy of all science. Compare it with the Pangenesis of Darwin, and

* "The doctrine, therefore, of the pristine fluidity of the interior of the earth, and the gradual solidification of its crust consequent on the loss of internal heat by radiation into space, is one of many scientific hypotheses which has been adhered to after the props by which it was at first supported have given way one after the other."—*Principles of Sir Charles Lyell*, p. 211, edition 1868.

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how vastly superior is the teaching! Compare it with the absurd representation of heads by Agassiz, and how infinitely more powerful is its self-evidence than all his fancies on the many human creations! I must say that it seems to need only that one fairly compare this Sacred Truth with that which sets up as its rival, in order to his feeling the innermost depths of his intellectual being reached with the conviction that Moses wrote as the taught of God.

The CHAIRMAN.—I am sure you will all be glad to return a vote of thanks to Professor Kirk for his very valuable contribution to our Transactions, and I now call on any gentleman who has any remarks to make to open the discussion.

Mr. POYER.—I shall occupy the attention of the Institute this evening but a very short time. If Professor Kirk were present, I should simply put to him one or two questions. But as he is not here, I must adopt a somewhat different method. I learn from the *Journal of Transactions* that on former occasions the Darwinian doctrine has been brought before the Society, once by Mr. Warington, and afterwards by the Honorary Secretary, and I am a little surprised that it should be brought forward again. Certainly I derived, myself, the impression from the second paper on the subject—the one by Mr. Reddie—that if the refutation of a superficial and irrational doctrine could possibly be made effectual and conclusive in the short space of some twenty pages, the work was then done once and for ever. I say that with some diffidence, as the Honorary Secretary is present, but I am sure he will not misunderstand the motive which leads me to make this avowal. Professor Kirk has founded his argument very much upon metaphysical considerations; indeed he tells us, in his opening, that he elects to discuss the subject metaphysically. That is to say, he takes hold of certain terms which he finds in Darwin's book, and endeavours to ascertain their essential meaning in their logical or metaphysical relations. I think, however, that he has ventured one or two rather large assertions. He braces some few terms together, and seems to argue that they have only a subjective validity—only a relation in the mind: that there is nothing external, nothing objective, corresponding to them. For instance, he takes the terms "form," "type," "life," "force," and "law," and says they are mere thoughts, there being nothing objective answering to them. That is rather a bold assertion. It would be tedious to take up all these points in order to test the accuracy of this view, and I will therefore content myself with one. He takes the word "type" and says that in itself it is nothing; but I wonder what he would say to an able metaphysical book which has been published by Dr. M'Cosh, called *Physical Types of Creation*. Dr. M'Cosh proceeds throughout on the assumption of actual objective types in nature. His whole argument rests upon that assumption from first to last. Then we have Biblical types. What is to become of the Judaic economy? That was a system of types. Are they only thoughts in men's minds? Are they not

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objective, external, palpable facts, the very grounds of thought? But I think Professor Kirk answers himself towards the end of the argument, for he uses the word "typical" in an objective sense on two or three occasions when he is referring to Agassiz. He says—"Here we have Africa and its typical negro"——

Mr. REDDIE.—But I think he shows that the so-called typical negro was nothing like the real African.

Mr. POYER.—No doubt he shows that in this case it does not answer to the idea of Agassiz. There may be wrong conceptions as to terms, but I take it that that has nothing to do with the doctrine——

Mr. REDDIE.—But Professor Kirk's view is a very fair one: if the type is merely an erroneous idea, it cannot represent an actual thing—it is merely a fancy.

Mr. POYER.—But the question is whether there is anything objective answering to types——

Mr. REDDIE.—I suppose you mean anything you may *call* a type. Professor Kirk does not object to your calling anything what you like, if you clearly understand the thing is not necessarily what you call it.

Mr. POYER.—I am much obliged for your suggestion. The next point that strikes me relates to the question of origin. Professor Kirk's criticism of Mr. Darwin's theory of origin comes to this: we are to go back, as it were, to the morning of creation, and then we are to consider whether the acorn precedes the oak or whether the oak precedes the acorn. If I understand Professor Kirk rightly, he is for the conception that the oak comes first and the acorn next——

The CHAIRMAN.—I must help Mr. Poyer out in this matter. I think a great many misapprehensions may be obviated if attention is paid to the first page, where Professor Kirk is answering the notions which men get from the phenomena of nature, to account for all things. He there shows how, by such premature reasoning, no reason can be arrived at at all. He says,—

"It is no doubt important that we should frankly face all such notions and put the reasonings by which men seek to sustain them to the test of sound and serious argument. To do so, we cannot rest satisfied with the teachings of what is frequently called science, to the exclusion of that which is regarded as philosophy. It is one of the grand delusions of a somewhat popular style of thought at the present day, that a man needs only to know phenomena in order to be truly intelligent in relation to nature."

I think the points Mr. Poyer has been raising are principally in relation to that passage.

Mr. POYER.—Yes; but here is a passage which is phenomenal. He says:—

"What good reason can any one give why we should fancy that the origin of such a succession must be in the seed and not in the matured individual which produced, or, so to speak, terminated in that seed?"

I say the good reason is given in universal knowledge, which shows the development by growth from seeds. It is not a question of secondary origin, but of primary origin——

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The CHAIRMAN.—Professor Kirk's point is that you cannot get particular origin from phenomena : the oak, and not the acorn, must precede the oak.

Mr. POYER.—I think considerable light is thrown upon this matter by the 4th and 5th verses of the 2nd chapter of Genesis :—

"These are the generations of the heavens and of the earth when they were created, in the day that the Lord God made the earth and the heavens, and every plant of the field before it was in the earth, and every herb of the field before it grew."

That, to my mind, is conclusive upon the point——

The CHAIRMAN.—I do not think you are at all at issue with Professor Kirk.

Mr. POYER.—Probably not. The argument is generally good, and logically maintained throughout its whole structure. Further on, in treating of Mr. Darwin's theories, Professor Kirk says :—

"In carrying out his idea of innumerable atoms such as would fly, each to its respective bone or part of a bone, or any other part of the material body, he speaks of the smallness of the atoms of the virus of small-pox that convey the disease, and of the small portions of diseased mucus from a plague-stricken ox, which is sufficient to corrupt the whole mass of a healthy animal when introduced into its blood ; and he says : 'The organic particles with which the wind is tainted over miles of space by certain offensive animals must be infinitely minute and numerous, yet they strongly affect the olfactory nerves.' But there are no such particles, any more than there are 'organic particles' in the sounds that affect the auditory nerves. He is dreaming of the old notion that led men to calculate all the 'imponderables' ; such as how light a bushel of smell must be, when a vase could give off as much as would fill and refill a large hall with that material for weeks or months together! He forgets that all such notions are banished from tolerably informed minds, and that smells, like sounds, consist of movements only."

But I fancy the medical faculty would be rather against him there, and that he would find it extremely difficult to account for the spread of diseases if there are no morbific atoms carried in the elements——

The CHAIRMAN.—I think that is a very important point.

Mr. POYER.—I must say one word more. Even if Mr. Darwin is to prevail, he must considerably alter his terms. When he talks of "the variety of species," he is uttering a palpable contradiction ; for species, whilst it admits of modifications, does not admit of variety. It would not be species if it did, for species is represented in a particular normal or regular form. Now, how can climate or the art of man effect a change in that ? I would venture to suggest that species is the incarnation, the embodiment, of the Divine idea, and as such it is unsusceptible of those varieties which Mr. Darwin speaks of, though capable of modifications within the limits of species. (Hear, hear.)

Rev. C. A. ROW.—I quite agree generally with Professor Kirk's paper, which I think is constructed upon very fair principles. I think, however, that there is considerable doubt as to what Professor Kirk meant in speaking of life. There is considerable diversity in the way in which life is spoken of

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but the following passage shows what Professor Kirk really meant. He says :—

"The moment any one speaks of true force, he leaves the strictly material, which may be seen, and turns, not his eyes, but his reason, to another province of being."

That, I think, shows that Professor Kirk does not mean to deny the absolute existence of these things, but he denies their existence, independent of any effort whatever on the part of the Creator and of the creature. Now I do not quite agree with Mr. Poyer in thinking that there is such an abstract existence as a "type." It seems to me to be inconceivable : it is a pure creation of the human mind——

Mr. Poyer.—Pardon me : I meant it in the concrete sense ; not in the abstract.

Rev. C. A. Row.—Well, whatever sense you meant it in, I cannot believe in its existence. I agree entirely with Professor Kirk that a type is a mere creation of the human mind, and that it exists nowhere else except in the Divine thought. As to life, I have already shown that what Professor Kirk means is that if you assume there is nothing whatever in existence except matter, the only thing you can see of life is motion——

The Chairman.—I am afraid that idea of life does penetrate the whole paper ; and I think there is great obscurity in that view.

Rev. C. A. Row.—I think so too. But what he means is this : that, apart from the existence of the mind, looking only to the material thing which his opponents take life to be, and supposing one examined it through a microscope, all one could see with the eye, and apart from the reason, would be motion. That is what he means ; but I think it ought to be made a little plainer in the paper——

Mr. Reddie.—I do not think we could have the paper altered, or else all your remarks would go for nothing. (Laughter.)

Rev. Mr. Row.—That would be serious, I admit. (Laughter.) But I cannot go with him when he says there is no such thing as a form. There is the external form of this table, and I suppose it exists in the table itself, external to my mind. But I want now to draw attention to a passage in the paper, where Professor Kirk gives an extract from Mr. Darwin. It seems to me that the great error of that gentleman is that he has personified abstraction : that is his great logical error. I have no desire to controvert Mr. Darwin's facts ; but if naturalists will enter into the domain of metaphysics and logic, I have a fair right to grapple with them, for I understand it as well as they do. I have carefully looked over the quotation, which may be taken as a fair sample of Darwin's book. It contains a number of abstractions. Mr. Darwin says :—

"It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the branches, with various insects flitting about, and with worms crawling through the damp earth,—and to reflect that these elaborately constructed forms, so different from each other,

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and dependent on each other in so complex a manner, have all been produced by laws acting around us."

Now it is necessary that we should have a clear perception of what we mean ; but here we are in a mist. Laws here are personified, and according to the sense in which they are here used, they can only have reference to the mind, and not merely to external nature. Mr. Darwin goes on to say :—

"These laws, taken in the largest sense, being growth with reproduction ; inheritance which is almost implied by reproduction ; variability from the indirect and direct actions of the external conditions of life, and from use and disuse ; a ratio of increase so high as to lead to a struggle for life, and as a consequence to natural selection, entailing divergence of character and the extinction of less-improved forms."

"A struggle for life"! I can perfectly comprehend a struggle between men and between animals ; but except in a metaphorical sense, a struggle for life is not true here ; and if we go into metaphors on such a point, we shall soon flounder in our logic. An error of the same kind is found in the line—"to natural selection, entailing divergencies of character and the extinction of less-improved forms." What Darwin understands by these forms is far from apparent to me. Let us take another instance :—

"Thus, from the war of nature, from famine and death, the most exalted object that we are capable of conceiving—namely, the production of higher animals, directly follows."

Now I can understand that animals may have a good hearty battle together, but I cannot understand, as an actual thing, the fighting of plants. That is quite beyond my comprehension——

Mr. Reddie.—But you know what he means ; namely, that a plant, unless it happens to be of a favourable species, will have to give way to others better adapted to the soil or climate. The weakest have to go to the wall ; they are extinguished in this "struggle for life."

Rev. C. A. Row.—What I say is that this method of speaking is bad in logic. It is positively mischievous, when we speak of struggles which are applicable to men and animals only, to apply them to plants. I suppose, as you say, that what Darwin means is this : that when a number of plants overgrow each other, the weaker plants get pushed down by the stronger. But in no proper sense of the word is that a struggle at all. I believe that throughout Darwin's book, and especially in relation to the term "law," there is an endless personification, as though laws were actual living ideas, capable of energizing. That is bad in logic. Then the expression "breathed into," which is used in the next page, belongs to the same category. So far as Darwin's new theory is concerned, it does not largely differ from what was written before the Christian era by Lucretius, who makes various assertions in relation to the same matter ; but it would take too long to go into that question. On the whole, Lucretius has some advantage over Mr. Darwin, because he admits variety in atoms. Professor Kirk says on page 16 :—

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"Darwin sees no definite idea—indeed no idea whatever—in the working out of the great natural processes."

And upon that is founded the whole of the misreasonings and strange conceptions of Darwin's book. The whole of the Darwinian theory presupposes a denial of final causes. My eye was not made to see with, or my ear to hear with. In one passage he says we cannot argue, because things appear to us in a certain way. But there is a certain principle in my mind, that when I survey certain things done by man, they naturally compel me to believe that there has been a living person or agent who has done them. If I am not able to conclude that, I naturally am not able to make a similar inference with regard to the works of the Creator. I know that the eye is a wonderful thing to see with, and when I see a telescope made by man, the argument is quite good that the one was evidently made with the same object as the other. An illustration of this has just struck me. Near Rome there is the Alban lake, which, before the Christian era, overflowed the land, and a tunnel was cut to let off the water to a lower level without damaging the neighbouring lands. When I see the remains of that tunnel, though I have not seen the workmen at work upon it, I am bound to infer that it was the work of man. Now we have got an Alban lake of a remarkable kind in the eye, which distils liquor to wash that organ, and when the water comes over the eye there is a tunnel cut through the solid bone to take the tears into the nose. When I see these things in the eye and the nose, am I not entitled to infer the existence of an intelligent Creator who planned with design? Professor Kirk refers to the chart of the human family, drawn up according to the instructions of Agassiz, in Nott and Gliddon's *Types of Mankind*. I have consulted a later edition of that book than the one referred to by Professor Kirk, and not only is the head of the African as villanous as you can possibly conceive, but I cannot recognize in the European the head of Cuvier. I quite agree that the drawing of the typical negro is astonishingly villanous. Possibly there is some confusion in the editions: there may be some slight error in the matter.

Rev. J. MANNERS.—I think this subject is one of the profoundest interest, and I am sure that with a little calm investigation we shall come to some satisfactory conclusion upon the subject, because, between the theories of Darwin and Agassiz there are really points of great importance which are, to a certain extent, reconcilable. I am sure no one will accuse me of finding fault with science, for in these days science has made gigantic strides of the highest possible use to every rational intellect. Modern researches have brought out most beautiful things that were not thought of in Newton's time. Discoveries are following and supplementing each other every day, and now we have the spectrum analysis, one of the greatest discoveries of modern times. We are greatly indebted to scientific men for having devoted their time, talent, and attention to the elucidation of these things. So with electricity and magnetism. And while science has been advancing, I do not think it has been aware or has taken notice of its own limits. I am sure of

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this, that true science merely deals with phenomena as such; but there is a field beyond that, and if I understand Professor Kirk rightly, there is a field beyond that, which is the field of wisdom. All true science must have its basis in the spiritual, in the living, and in the real; and therefore I go back to Genesis, and see there how all these things are brought out in the most beautiful order. If I come to our own being, I see in us that which takes me to the very origin of creation. If we speak of origin of creation, it must spring originally from the first moving cause of all being and all nature, and all being before nature. If we had time to go into the large subject which this opens up, I am sure we should certainly see the cause of all these varieties, and we should have an exhaustive commentary upon all the grand and glorious truths which are recorded in the 1st, 2nd, and 3rd chapters of Genesis.

Mr. PHENÉ.—As a stranger to this Institute, may I be allowed to say that I think this a most admirable paper, and that the only valid point of objection to it, that I can see, is that which has been already pointed out by Mr. Poyer, as to whether there are sporacular particles in odour or whether it is merely a form or effect of motion. As to the point raised by Mr. Row, with regard to the struggle in plant life, I would ask him what he would say of parasites —one plant growing on another, and not only living upon it but killing it? Look at the various species of parasitical plants, to say nothing of fungi, of which the parasites of the gorse and clover afford instances. In Devonshire, I have seen large masses of fern growing from the oak. That appears to me to be an illustration of an actual "struggle" in plant life. (Hear, hear.)

Rev. Dr. RIGG.—I am anxious to pay my tribute to this paper. It is rare to find a man who is at once a man of science and a thorough metaphysician, and at the same time a thorough believer in the Scriptures. I take it that Professor Kirk combines all these three qualities in himself, and I must say I do not complain of the obscurity of the passages which have been pointed out. One of the passages pointed out is :—

"The moment any one speaks of true force, he leaves the strictly material which may be seen, and turns, not his eyes, but his reason, to another province of being."

Now that sentence will bear any amount of consideration, and you cannot easily express a truth more easily or more exactly. It is a profound thought, removed from the region of common apprehension or misapprehension, and therefore it needs a considerable amount of study before we apprehend it in its exactness. Then Professor Kirk says :—

"In dealing abstractedly with forms and types and laws of life, it is necessary to remember that we are dealing with states of mind only."

Surely that must be true. It may be that there are eternal ideas;—and here I may be permitted to say that I have often wanted to see a living Platonist, and it has been my felicity since I came to the

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Victoria Institute, to have that privilege. (Laughter.) I believe there is a certain amount of truth at the bottom of Platonism, as there must be at the bottom of every system that has ever taken a great hold upon the human mind and understanding. I have no doubt, then, that there is some truth at the bottom of the mystical dogma of eternal ideas as held by the Platonists, and held and taught by a certain school of mystics in the present day. The truth may be, and Professor Kirk seems to think it is, that species are original realities, or divine ideas, if I may so speak. That seems to be Professor Kirk's belief. He says that varieties have come to be called species, but that if we could get to a really true absolute species itself, we should find that that species is pure and true and unchangeable,—a created thing,—in some way or other a distinct emanation from the Divine mind and will. Genera are mere abstractions, the general names of classes, the mere creatures of our own thinking; varieties are instances of species, and may change,—they are the mutable living forms which embody the original Divine idea; species are the original ideas themselves. I do not know that that is proved, but I am glad to find there is a philosopher and metaphysician who thinks so; that he, having examined for himself, holds to the doctrine and believes it to be a theory in accordance with both science and Scripture. But so far as species are concerned, I apprehend that whatever may be our faith as to their being ideas and types in the Divine mind, to make them causative would be to reproduce the very error of Darwin in another form, the very error which we combat,—namely, that of making laws to be what laws are not, and what they never can be,—causes. To say that the "laws" of Darwin and modern philosophers, or the ideas of Plato, or of the Neo-Platonists, or of the modern Platonic school—to say that these laws or ideas are real causes, would be to put God out of the way in the one case just as much as in the other. We must think either of ideas in the Divine mind which we can only imperfectly apprehend; or of species and varieties, as conceived by ourselves. As we define them they are nothing in the world but our own ideas. For my part, I do not believe that form has any being apart from some conceiving mind. There is a vast amount of truth in this paper of Professor Kirk's, which we should do well to consider; and we ought to feel exceedingly obliged to Professor Kirk for the manner in which he has brought forward his ideas. I confess I have myself no sort of difficulty or delicacy about recognizing Professor Kirk's view when he speaks of life as some kind of form or law of movement. I believe that is the case. As far as inferior life is concerned, it is some law producing movement, as in the plant for instance. And the more philosophers try to look at the whole mystery of the universe and penetrate all its phenomena, the more they are disposed to come back to the feeling that force in some form is ultimately will; and I do not see why we should quarrel with that conclusion at all, so long as we hold that there is one God over all, and that His will is working all things.

Rev. J. B. Owen.—I have just one word to offer condemnatory of the bad

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logic that arises from figures and metaphors. I need not remind you, as theologians, of the vast amount of mischief which has arisen from that in interpreting the views of the Fathers. They have been made to say a great many things as matters of fact which in their minds were simply figures ; and hence the danger of being too poetical. (Laughter.) We sometimes find fault with this or that man for being rather prosy, and no doubt it is a bad fault in a public speaker to be prosy ; but the prosy speakers are generally the safer men. (Laughter.) Those prosy speakers seldom make mistakes. I think the gentleman who spoke first will forgive me for saying, in a good-humoured way, that I listened to his strictures upon Professor Kirk's use of the words "life," "form," "force," "uniformity," and so on, and came to the conclusion that he rather proved Professor Kirk's case, for he really made nothing of them himself. (Laughter.) The Professor said those things were non-realities, fancies of thought, though expressions useful and convenient enough in carrying out a discussion or in writing a thesis. All language in its origin having been hieroglyphic, all the figures in human speech are the posterity of the original hieroglyphics, only described in words instead of in the mental thought, which narrowed the line. But in reasoning it is unfair to part from the question in order to reason from the figure. Mr. Row has put into my hands a quotation showing the danger of this. There is a certain dishonesty in using this kind of figure—the personification of senses in nature. Just assume for a moment that there is a power of natural selection. You will remember that Professor Kirk quotes a passage involving one of the operations of thought both in plants and animals, for we know what this "natural selection" means,—it is the result of a syllogism made in the mind. It is a curious notion to expect to find a syllogism in the brain of a cabbage (laughter) ; the power to add two and two together, and to draw a conclusion and act upon it——(Laughter.)

Mr. Reddie.—But not more difficult than it would be to find the brain in the cabbage. (Laughter.)

Rev. J. B. Owen.—That is true. This is the extract which Mr. Row has supplied me with :—

"We must suppose that there is a power of natural selection "—

Now mark the personifying here !—

"Always watching each slight accidental variation in the transparent layers, and carefully selecting each alteration which under varied circumstances may in any way or in any degree tend to produce a distinctive image."

Here is the work of a first-rate artist,—a combination of the artist, the philosopher, and the man of business, all in an eye ! (Laughter.)

"We must suppose each new state of the instrument to be multiplied by the million, and each to be preserved till a better be produced, and then the old ones to be destroyed. In living bodies variations would cause the slight alterations ; generation will multiply them almost indefinitely ; and natural

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selection will pick out with unerring skill each improvement. Let this process go on for millions on millions of years ; and during each year on millions of individuals of many kinds ; and may we not believe that a living optical instrument might thus be formed as superior to one of glass as the works of the Creator to those of man ?"

That is a pretty paragraph, but it proves nothing. And now, before sitting down, let me express my great gratitude to that clear-headed, excellent man, Professor Kirk. The only thing I have to regret, without intending to be in the slightest degree disrespectful to our hon. secretary who read it so well, is that the Professor was not here to read it himself to us.

Mr. Reddie.—It is now so late, that although so much time has been wasted on verbal criticism both of Mr. Darwin's and of Professor Kirk's mere modes of expression, and so little attention has been paid to the argument and thesis of the paper before us, I find I must leave our chairman to do justice to the author, and must confine myself to noticing one or two points where I do not altogether go with Professor Kirk. It is not an adequate definition of life to call it merely a "movement" or "force." I should like Dr. Rigg to explain what is the distinction between life and the motion of life, just as we can distinguish between the law or force of gravitation, and the motion of a falling body. We surely have a clear conception of something distinctive between every such law or force and its effect——

Rev. Dr. Rigg.—I should be sorry to say that it is a sufficient definition, and Professor Kirk does not say so. All that he meant to say is, that in general, life is a form of movement or force ; but he does not undertake to define the special form in regard to each particular species of living thing.

Mr. Reddie.—But I say that the force of gravitation is a clear conception to my mind, apart from the motion it may produce, whenever I feel the pressure of a heavy body. When you take a stone in your hand, you feel the force of gravitation without any motion at all. But I cannot understand any man who thinks clearly and argues philosophically trying to upset this language, which is common to the Principia of Newton and to the reasonings of Galileo. Even Dr. Rigg, when he adopted the same notion as Professor Kirk with regard to life, showed that he could not go on talking intelligibly while he retained that imaginary and faulty definition of life as being merely movement ; for he spoke, not of life being a movement, but of the *law* of life *producing* movement. He used the word "law," and I do not see how he can fail to recognize the weight of the argument that forces do exist distinct from the movement they may produce. In these gemmules, when examined under the microscope, the motion is something in the material thing moved ; but the cause of the motion, or what we call life, is something besides, that cannot come under the microscope. We had a similar view, which I ventured to oppose, advanced by Professor Kirk the session before last. But I agree cordially with the general scope of his paper ; and I am only sorry that, if there are any opponents to it, they do not meet his arguments now. The idea of these gemmules is, I fancy, analogous to the atomic theory to be found

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in Lucretius, though it takes a somewhat different shape ; but this notion of gemmules being thrown off from living beings, appears to have been put forward by Mr. Darwin to cover his retreat from some of his earlier views as to development. At the same time, we have also Professor Huxley now putting forward the theory of "protoplasm," which is worse than the theory of gemmules. I confess I cannot understand how rational beings can gravely put forward such mere rubbish, in the name of science. Grant that these imaginary gemmules exist and are the cause of all the varieties in life ; and of course it follows that all is explained ! And so, grant that the poisonous protoplasm of the nettle is the same with the substance of all life and health, and then of course "protoplasm" explains all ! But when we ask for proof of either, there is none. These are modern instances, in fact, of the most objectionable form of mere idle speculation and of non-inductive philosophy.

The CHAIRMAN.—It now only remains for me to express my general concurrence with the whole argument of this admirable paper, with the exception, perhaps, of the argument on life. So far as the general scope of the paper is concerned, nothing could have been more admirable or convincing. A more logical paper could not have been written to expose the absurdity of Darwin's two theories, and to show how utterly impossible it is, by any logical process whatever, to reconcile them. That, then, must be a sufficient excuse for our now reconsidering the subject of Darwinism, for since our first two papers on the subject were read and discussed here, Mr. Darwin has set forth his new theory of pangenesis. It is only right that that new theory should be met and argued upon, and that it should be shown how utterly irreconcilable it is with his first theory. Illogical and untenable as his first theory was, he has now utterly destroyed it by the succeeding theory which he puts forward to bolster it up. We are often told that no scientific man believes anything but this, or that no scientific man believes anything but that, and that scientific men do not believe in the history of creation as set forth in the beginning of Genesis. But here we have a convincing proof that scientific men as eminent, and naturalists as eminent, in every degree as Mr. Darwin himself are altogether at issue with his theories of creation, and that entirely upon scientific grounds. I think Professor Kirk has done well in coming in as a moderator between Agassiz, who is an eminent naturalist, as eminent as Darwin, and Mr. Darwin. He shows you that, with all their philosophy and all their science, they have not been able to make a single step in advance of the science which is to be found in the very early chapters of the book of Genesis, which we have lately been told were nothing more than the imaginings of a Hebrew Descartes. I think Professor Kirk's passages with regard to life are important, because they have a bearing on what has been put forward by Professor Huxley on the same subject. The peculiar notion which Professor Kirk seems to have of life is that it is essentially motion, and nothing but motion. He says :—

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"The electric shock we now know does not discharge particles of some peculiar substance, called 'the fluid of electricity,' through that body which is rendered a lifeless mass by it in less than a second of time. It communicates only such a motion as absorbs that other motion which we call Life, and leaves that stagnation which we call Death."

Then he has another passage very much in the same way :—

"This is in perfect accordance with all that true science teaches, though not the result of unaided human inquiry, such as claims the monopoly of being that science. In the lowest specimen of human kind there is a life, or movement of spirit that is specific in the highest sense of the term—a movement which rises to the Creator Himself, and marks Him out as the object of either love or fear."

From these passages I believe Professor Kirk has some peculiar notions of that motion which he calls life, and no doubt he does hold that motion to be something essentially and totally distinct from inanimate motion, or the motion of inanimate matter. That, I think, is fully borne out by another passage, which better explains his meaning :—

"I am not sure about his 'evidence' of a state of the earth when it was impossible for living beings of any sort to exist on it ; but I am fully convinced with him that there was a time when life began, and that He who gave it origin gives it continuity."

I am afraid that perhaps Mr. Kirk has narrowed his subject somewhat too much by the endeavour to make it purely metaphysical. He has unconsciously followed in the same track, traversed in another way by Professor Huxley, who, in the current number of the *Fortnightly Review*, has given a paper on "The Physical Basis of Life," or "protoplasm," which paper contains the substance of one of the Sunday evening lectures, delivered in Edinburgh to teach men science, "in order to take away some portion of the ignorance and misery existing in the world." When we see such an announcement we are curious to ascertain what is the sort of Sunday teaching which these men are taught in order to take away that ignorance and remedy that misery. But what do I find the whole of that teaching, so far as this particular lecture is concerned, to be? Simply this, that if you go into the lowest forms of life, whether you find it in the sting of the nettle or in the humblest forms of vegetable life, which indeed you can hardly call life except for its motion and powers of propagation, and when you ultimately get down to the very lowest form of life—to the living being, which is the very nearest approach to that which is not living—you come to what Professor Huxley calls "protoplasm," which, a little while ago, was only known as the homogeneous fluid lining the inside of the cell of a plant. We are now taught that that is "the physical basis of life ;" that there is not one single particle of our whole body, or of any part of our body, which was not, at one time or another, a protoplasm, and that that is the essential unity of life found pervading all creation. Then he goes on to tell us that there are two kinds of

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this protoplasm: there is the protoplasm which the plant elaborates out of the mineral kingdom, and the protoplasm which the animal elaborates out of the protoplasm of the plant. The animal cannot elaborate protoplasm out of the mineral elements of the earth at all. That may be all very true so far as the analysis of the dissecting-knife and the microscope may go, but Professor Huxley makes a great jump from that, and tells his auditors that that protoplasm—and, by the way, it is very hard to find the meaning of Greek words of that kind, especially when a literal translation gives no idea of the thing which is meant—he tells his auditors that that protoplasm is nothing more than a combination of carbon, hydrogen, oxygen, and nitrogen in some complicated form—he tells us that the chemists have not yet got the proper proportions of these elements, but that if you want to find a good equivalent for protoplasm you will find it in the white of egg, and you may be satisfied that all the elements of your body are to be found in a little smelling-salts dissolved in water! (Laughter.) "Here you are, all masses of changed protoplasm!" (Laughter.) But we want to know what that mysterious thing called life is, because even Professor Huxley cannot get out of the habit of talking of "living beings," and "organic and inorganic matter." What I complain of Professor Huxley is, that while he tells his auditors that living protoplasm differs in no degree from the dead carbon, oxygen, hydrogen, &c., of which it is formed, except in the nature of the chemical combinations of those elements and in their proportions, he also assures them that there is no such thing as vitality existing in nature; and that which we call vitality—all the movements we see under the microscope—are nothing more than the action of those ordinary molecular forces which reside in the elements carbon, hydrogen, nitrogen, &c. The passage is a very strong one. Professor Huxley says:—

"When hydrogen and oxygen are mixed in a certain proportion and an electric spark is passed through them they disappear, and a quantity of water, equal in weight to the sum of their weights, appears in their place. There is not the slightest parity between the passive and active powers of the water and those of the oxygen and hydrogen which have given rise to it. At 32° Fahrenheit, and far below that temperature, oxygen and hydrogen are elastic gaseous bodies, whose particles tend to rush away from one another with great force. Water, at the same temperature, is a strong though brittle solid, whose particles tend to cohere into different geometrical shapes, and sometimes build up frosty imitations of the most complex forms of vegetable foliage. Nevertheless, we call these and many other strange phenomena the properties of the water, and we do not hesitate to believe that in some way or other they result from the properties of the component elements of the water. We do not assume that a something called 'aquosity' entered into and took possession of the oxide of hydrogen as soon as it was formed and then guided the aqueous particles to their places in the facets of the crystal, or amongst the leaflets of the hoar-frost. On the contrary, we live in the hope and in the faith that, by the advance of molecular physics, we shall by-and-by be able to see our way as clearly from the constituents of water to the properties of water, as we are now able to deduce the operations of a watch from the form of its parts, and the manner in which they are put

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together. Is the case in any way changed when carbonic acid, water, and ammonia disappear, and in their place, under the influence of pre-existing living protoplasm, an equivalent weight of the matter of life makes its appearance? It is true that there is no sort of parity between the properties of the components and the properties of the resultant, but neither was there in the case of the water. It is also true that what I have spoken of as the influence of pre-existing living matter is something quite unintelligible; but does anybody quite comprehend the *modus operandi* of an electric spark, which traverses a mixture of oxygen and hydrogen? What justification is there, then, for the assumption of the existence in the living matter of a something which has no representation or correlative in the not living matter which gave rise to it? What better philosophical status has 'vitality' than 'aquosity'? And why should vitality hope for a better fate than the other 'itys' which have disappeared since Martinus Scriblerus accounted for the operation of the meat-jack by its inherent 'meat-roasting quality,' and scorned the materialism of those who explained the turning of the spit by a certain mechanism worked by the draught of the chimney?"

Now, I have very carefully read the whole of Professor Huxley's paper, and this is the only argument I can find for making us believe that there is no such thing in existence as life or vitality beyond the ordinary action of the molecular forces, whatever they may be, when these atoms are brought into a particular state of combination. But the whole of that passage shows the peculiar condition of mind of those naturalists who deny the existence of vitality. He says: "We don't believe that such a thing as 'aquosity' entered into the particles of the oxide of hydrogen when they formed themselves on our windows into those beautiful frosted figures which represent to many minds the appearance and growth of a plant." I have known many persons highly delighted when they have seen under the oxy-hydrogen microscope crystalline forms rushing across the object-glass, and producing in an instant of time the most wonderful vegetable forms, as you would suppose. But that passage betrays the greatest ignorance on the part of Professor Huxley. There is not the slightest analogy on earth between the formation of any crystal and the growth of any plant. He talks of the Protean forms of carbonate of lime: he might also have mentioned the Protean forms of silica. What does he mean by these Protean forms? He means that crystals of carbonate of lime present an enormous variety in the external form of the crystals and in their relation to each other. But, although these forms are bound to each other by certain geometrical laws, no crystallographer whatever could anticipate or prophesy with anything like accuracy whether any particular form could or not be found within certain limits. What takes place in carbonate of lime or silica, or oxide of hydrogen, or any of these crystalline bodies? The greatest diversity of external form, with the greatest possible identity of internal structure. But what have you in a plant? The greatest pertinacity with respect to external form, and at the same time the greatest diversity of internal structure. That is one difference, among many, between living beings and dead crystals. It is a law running through the whole of animated nature that you have the greatest possible diversity of internal constitution of the same plant or animal with the greatest uniformity

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of external form. In crystals you have the very reverse. But Professor Huxley need not have gone to oxide of hydrogen for his crystals when he had carbon at hand. When pure particles of carbon are allowed to come into contact they will crystallize just as much as the oxide of hydrogen. The diamond is nothing more than a crystal of the pure chemical agent carbon, and no doubt if oxygen, or hydrogen, or nitrogen could be sufficiently cooled or condensed, they would also obey the laws of crystals and crystallize. Similar substances which exist in a solid form do crystallize. We know that phosphorus, sulphur, gold, silver, iron, tin, lead—will crystallize according to certain laws, and there is reason to believe that crystallization is inherent in all dead matter. But when we come in contact with living matter, we come to something very different. Professor Huxley tells us that the great object of his science is to get rid of all these "itys." He wants to know if we can take "aquosity" as a power existing in the water; and the first illustration he uses is, that if you take oxygen and hydrogen and mix them, they are only a mixture of oxygen and hydrogen, but if you pass an electric spark through them, water is formed. He then asks if I know the *modus operandi* of that electric spark. I say I do not, but the electric spark is not the only thing that will produce that result. Any spark whatever will do it, for there is a law that if the atoms of oxygen and hydrogen, in proper proportions, are brought within a certain nearness of each other, whether by an electric spark or by a common light of any kind, they will combine and form water, that is an ordinary law of nature. If you put into that mixture of oxygen and hydrogen a little piece of a certain description of platinum, all the particles of which are in a spongy state—which allows a kind of capillary attraction, if I may so call it, to operate,—that has the power of bringing the two gases into contact with each other, combination takes place, and you have water formed. In the same way you have only to put into the mixture a piece of pure platinum, provided it is perfectly clean, and the same effect is produced. But is there anything in this at all analogous to living protoplasm? Does it go on producing water? Is there any power in water like that? In the most insignificant form of protoplasm which you can deal with, you find you have something higher than chemical, mechanical, or molecular force. But you have not got rid of all the "itys," even according to Professor Huxley's own illustration. He is obliged to have recourse to the "itys." He takes the oxygen and hydrogen, combining them in certain proportions by their weight: there you have an "ity"—gravity. Then by means of electricity—another "ity"—he gets them to combine, and you have chemical affinity—a third "ity." So that we have three "itys," in his own illustration of the formation of that very thing in reference to which he scoffs at the term "aquosity." He has to admit the existence of three "itys" in that. But this is very important. I think there is something here which might have got the professor out of the slough of materialism, which he told his hearers he had led them into purposely in order that he might afterwards get them out of it. The whole argument of the paper is that, in the present state of modern science, men of science cannot go on in any other way than

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by using materialistic formulæ, as the only formulæ which will advance science. The spiritualistic formulæ, he says, if true, will not advance science one bit. Now, it is not until the end of the paper that he attempts to get his hearers out of the slough of materialism into which he had purposely led them. Just as he says there is no such thing as vitality, he maintains there is no such thing as human thought, except the mere molecular action of the protoplasm of his brain, and the protoplasm of his hearers' brains sitting in judgment on what he tells them. And yet he says that, after all, he is no materialist; that materialism is utterly ineffectual; and moreover that "systematic materialism may paralyze the energies and destroy the beauty of a life." But he has no way of getting the people out of this slough of materialism, except by speaking contemptuously of all the higher and nobler branches of true philosophy. He says:—

"I bid you beware that, in accepting these conclusions, you are placing your feet on the first rung of a ladder which, in most people's estimation, is the reverse of Jacob's, and leads to the antipodes of heaven. It may seem a small thing to admit that the dull vital actions of a fungus or a foraminifer are the properties of their protoplasm, and are the direct results of the nature of the matter of which they are composed. But if, as I have endeavoured to prove to you, their protoplasm is essentially identical with, and most readily converted into, that of any animal, I can discover no logical halting-place between the admission that such is the case and the further concession that all vital action may, with equal propriety, be said to be the result of the molecular forces of the protoplasm which displays it."

We suppose we are coming to something definite here; but he goes on to tell us, further on, that—

"We can have no knowledge of the nature of either matter or spirit; and the notion of necessity is something illegitimately thrust into the perfectly legitimate conception of law; and the materialistic position, that there is nothing in the world but matter, force, and necessity, is as utterly devoid of justification as the most baseless of theological dogmas. The fundamental doctrines of materialism, like those of spiritualism, and most other 'isms,' lie outside 'the limits of philosophical inquiry,' and David Hume's great service to humanity is his irrefragable demonstration of what these limits are. Hume called himself a sceptic, and therefore others cannot be blamed if they apply the same title to him; but that does not alter the fact that the name, with its existing implications, does him gross injustice. If a man asks me what the politics of the inhabitants of the moon are, and I reply that I do not know; that neither I nor any one else has any means of knowing; and that, under these circumstances, I decline to trouble myself about the subject at all, I do not think he has any right to call me a sceptic. On the contrary, in replying thus, I conceive that I am simply honest and truthful, and show a proper regard for the economy of time. So Hume's strong and subtle intellect takes up a great many problems about which we are naturally anxious, and shows us that they are essentially questions of lunar politics, in their essence incapable of being answered, and therefore not worth the attention of men who have work to do in the world. And he thus ends one of his essays:—'If we take in hand any volume of divinity, or school metaphysics, for instance, let us ask, Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No.

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Commit it, then, to the flames, for it can contain nothing but sophistry and illusion.' "

All he can find to comfort the minds of the changed protoplasm listening to him, is that all high and noble things are mere sophistry and delusion. He might have gone back to his simple illustration of the Protean forms of carbonate of lime, and he might have spoken of silica. We have not to ascend very high up in the scale of animal creation before we find masses of protoplasm—nothing but the pure protoplasm he speaks of,—apparently homogeneous masses, displaying under the microscope no traces of structure, but only the marvellous movement he speaks of in the protoplasm of the nettle. But what do we find that living—not dead—protoplasm doing? We find it having the power of seizing upon the particles of carbonate of lime with which it comes in contact, while another species of protoplasm seizes on particles of silica, and with them they build up marvellous structures, not of protoplasm, but of pure carbonate of lime, or of pure silica. They elaborate those materials into some of the most beautiful forms you have ever seen under the microscope. You have seen those beautiful pieces of transparent silica, which they have worked upon, giving you, under the microscope, all the apparent markings of an engine-turned watch. And that one species of protoplasm has gone on from the time of its creation, for thousands and thousands of years, building up such masses of silica as those, and elaborating them into those beautiful forms—perfectly uniform in external form—and entirely different from the Protean forms of silica or carbonate of lime crystals. The living protoplasm of one species alone has the power of taking particles of carbonate of lime and building them up into beauteous structures unchanged through thousands of generations. The molecular forces, on the other hand, uninfluenced by living protoplasm, build only Protean forms of crystals having no analogy whatever to the permanent structures produced by living agents. In spite of Darwin's supposed law of progression, Professor Huxley is obliged to admit that these very forms of carbonate of lime and silica, built up by masses of protoplasm, which are but the creatures of a day, perfectly ephemeral—he is obliged to admit that these forms of lime and silica have been left as a token of the living powers of the protoplasm that formed them. All the immense masses of our chalky rocks are the works of these little creatures, whose descendants are forming now, like strata upon the bed of the Atlantic ocean. The deposits, dredged up recently from the depths of the Atlantic, are precisely the same as those found in the white cliffs of Albion, so that there is nothing here to lead us out of the slough. I will not enter upon any details concerning such marvellous structures as the ear, the eye, or the heart of man; but I would ask, Am I to have no curiosity to go beyond the mere operation of molecular forces for such extraordinary formations as these? The wisdom, the marvellous power, the marvellous science shown in these things—surely it must be a branch of pure philosophy to inquire into them. I know what was Newton's philosophy, for he has told us the eye and the ear could not have been

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formed without wondrous skill in optics and acoustics. But even Professor Huxley admits that there is a something which he cannot get over, but which would have led him out of the slough. He says :—

"We may by-and-by be able to see our way as clearly from the constituents of water to the properties of water, as we are now able to deduce the operations of a watch from the form of its parts and the manner in which they are put together."

Now what does a watch consist of? So much brass, so much steel, perhaps so much gold—but that is only in the ornamental part. There you have the protoplasm. (Laughter.) But I ask you, is that all a watch contains? You say "Yes; all that science can teach you is that a watch contains so many particles of iron, and zinc, and copper." But then these things are very cunningly arranged together; there is a most marvellous cunning in the arrangement of all the parts; and I find the watch does for me that which the earliest of the human race had no knowledge of at all —it keeps accurate time for me by taking advantage not only of molecular forces, but of certain laws of mechanics which it took the human race a very long time to discover. Some one had the wit to discover that a pendulum vibrated pretty evenly in seconds of time, according to its length, and when he wanted to get rid of the burdensome pendulum, he found that a small fine spring of steel which would bend backwards and forwards, would answer the purpose as well, and that this, in conjunction with certain wheels and other works, could be made the means of measuring the time just as accurately as by the pendulum. The watch therefore has something in it beyond the mere protoplasm of iron, zinc, and copper. I must not call it vitality—but it has something in it which does not at all belong to molecular action. And it has a great deal more: there is impressed upon it a certain amount of human wisdom and thought and experience, all, as it were, embodied and contained in it. Am I then to make no inquiry about these things, but put them down at once as mere lunar politics? Is not this as really a true subject of science or philosophy as anything about protoplasms and carbon or hydrogen or nitrogen? But Professor Huxley might have gone further. He says :—

"Why should 'vitality' hope for a better fate than the other 'itys' which have disappeared since Martinus Scriblerus accounted for the operation of the meat-jack by its inherent 'meat-roasting quality,' and scorned the 'materialism' of those who explained the turning of the spit by a certain mechanism worked by the draught of the chimney?"

Well, it may be that Professor Huxley is too refined a specimen of human intellect to admit the jack as a witness; but there is the same kind of power displayed in the mechanism of the jack, the same evidence of human thought and invention, mastering the mere material elements and making them work in order to save a man the trouble of turning the spit which turns the meat he desires to roast. By means of a little iron and brass and the smoke of the chimney he is enabled to have the work done which otherwise he would

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have had to do with his own fingers, to the material detriment and consumption of his own protoplasm. (Laughter.) Professor Huxley laughs at the man who "scorns the materialism of the jack," and attributes its motion "to its meat-roasting quality." But does its motion come from its materialism, or would it have had that motion if something immaterial had not in the first place been brought to bear upon it? Here too, however, we are brought back to "human politics" not "lunar politics." (Laughter.) A man boasts that he can send his thoughts through the depths of the Atlantic, and communicate with a continent thousands of miles away by means of that "ity"—electricity. But we do not speak of that as being a matter of materialism—we talk of it as one of the greatest achievements of the human intellect. But if I admit that this is one of the grandest achievements of the human intellect, what must we say of those wonderful electric cables, the nerves of my body, which convey such marvellous sensations to my brain? They are analogous to the electric apparatus which man makes, but they were not made by man—they were not formed by human wisdom. When man discovered how to make the electric apparatus he found that the electric-eel had already a galvanic battery in its body which no human science has ever been able to imitate. He finds an eel containing a battery sufficiently powerful to convey men's thoughts from the Old World to the New. There it exists in a living form, made by a living protoplasm in the eel. But is that electricity the work of the protoplasm in the body of the eel? No more than the meat-roasting quality of the jack, or the time-keeping quality of the watch, is the work of the brass and iron and other materials of which they are composed. But surely it is not lunar politics which induces us to inquire into these things? What does Professor Huxley's own branch of science—physiology—teach us? Has that been advanced by materialistic formulæ? I maintain that it has not, and that the whole progress of that science gives the lie to what he says when he tells us that the materialistic formulæ alone, and not the spiritualistic formulæ, will make advances in scientific discovery. It was not the materialistic formulæ which led Newton to discover gravitation, for he was searching after the first great cause—after that wisdom displayed in God's works which always worked in the simplest and most beautiful way possible. It was not the materialistic formulæ which led Harvey to discover the circulation of the blood. He told that Christian philosopher, Boyle, that he derived the hint that led to the discovery, from the fact that he found veins had valves in them. He argued that those valves would not have been put there except for use, and their position taught him in which direction the current would flow. Take all the greatest discoveries in physiology; point out one, if you can, which has been discovered by those materialistic formulæ, which would reduce all the works of the Deity to the mere dead operation of mechanical laws. All the greatest discoveries in the mere material world have been made by those who have searched for perfect wisdom in all God's works. Sir Isaac Newton thought it was impossible to make an achromatic telescope, and therefore all that he made were reflecting telescopes; but he was misled

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by imperfect observation, or by a hasty generalization from the refractive powers of certain salts of lead. But what led to the discovery and the formation of the achromatic telescope was the observation of a man, who said "the instrument which God had made for man to see with must be the perfect instrument." He knew that when he used an unachromatic telescope everything he saw was confused and tinged with various colours, while there was none of that confusion or colouring in the images which were depicted on his own retina. He went directly to God's works, and asked them how it was that the marvellous thing was produced. He found that in the eye there were three different lenses, and that those lenses possessed not only different refractive, but different dispersive powers ; and he calculated how, by lenses of different substances, he could imitate imperfectly in the telescope what was perfectly done in the eye. Then the astronomical refracting telescope not only became a possibility, it became an actuality in science. But in all its perfection it is a very long way from the eye, which Darwin supposes to be made without any skill in optics. The eye contains wonders in its construction which the physiologist and physicist have not yet fathomed. With all their skill and power they cannot combine the telescope and microscope in one instrument, and no physiologist has yet been able to tell us what is that marvellous power of the eye by means of which we can see distinctly an object within six or seven inches, and also the furthest star that manifests itself to the vision. Men have had a suspicion that there is a marvellous mechanism doing all this, but they have not been able to read that mechanism yet. Will they read it best by the materialistic formulæ, or by the spiritualistic formulæ, which teaches them that it was made by Him who not only made that optical instrument, but who also made all the laws of optics, and made the two in perfect conformity with each other ? You may depend upon it that the highest spiritual philosophy will most advance science, and also be most in accordance with common sense. (Loud cheers.)

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ORDINARY MEETING, MARCH 1, 1869.

THE REV. WALTER MITCHELL, M.A., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the HON. SECRETARY announced the election of the following :—

ASSOCIATES, 2ND CLASS :—Rev. John Harvard, Sheffield ; S. Hill Smith, Esq., Sheffield ; George Race, Esq., Darlington.

The REV. DR. IRONS then read the continuation of his Paper as follows :

ANALYSIS OF HUMAN RESPONSIBILITY. (*Part Second.*)

CONSPECTUS.

IX. The Supreme Governor of conscious beings has *Personality.*
(The opposite supposition involves a contradiction.)
There is a *correspondence of character* in all moral beings ;
(and therefore in the Moral Governor and those governed).
There is *reality* demanded in all dealings between them.
(Speculations concerning this reality do not disprove it.)
Pantheistic and Humanitarian speculations,
more apparently than truly antagonistic.
The former cannot deny the "true-always" ;
The latter cannot limit itself to the "phenomenal."
"Regulative-knowledge" and "anthropomorphism" are nearly the same.
Both these speculative philosophies are prevalent :
Example of each in modern times.
We must not accept premisses without the conclusions.
We must examine the premisses. (§ 52–59.)

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X. Early speculations as to the relation of the Supreme Being to the Finite, admitted by the Christian schools.

Parmenides, and the Eleatics : (Logical tendency of Pantheism to Atheism).

Confusion in the premisses : inaccuracy also in the inference.

(The conscious being may not be confounded with the phenomena.)

The Eleatic philosophy was resisted—and modified.

The neo-Platonician view—semi-Eleatic.

View of the Christian ante-Nicene doctors—less Eleatic.

View of the Christian post-Nicene doctors—again more Eleatic.

(Progress of Eleatic thought in the West.)

Mediæval and modern schools—Eleatic.

The foundation-errors of this philosophy.

The Eleatic *premisses must be rejected ;*

and man must be in correspondence with the Supreme.

(§ 60–72.)

XI. Dependency of the finite.

The conscious agent should *approve what the Supreme approves.*

(Hence the largeness of the range of Responsibility.)

How *Relation of Dependence* on the Supreme here arises.

Certain acquired relations not unnatural :

But imply *diversity* in some respects—as well as *sameness.*

Beginnings of Goodness in the moral agent, compared with the Supreme Good.

The Highest Goodness is Necessary Goodness.

How it is also *voluntary ?*—(Voluntariness not injured by interior determination.)

Distinctions between the finite and the Supreme marked by the *Finitude.*

The idea of "the good," distinct from that of *the limit.*

Relation of the Supreme, and of the finite, *to the true-always ;*

quoad naturam and *quoad actum.*

Relation of the Supreme, and of the finite, *to the phenomenal.*

(The bearing of this on moral contingency.)

Relation of the Supreme to the *continuous.*—He possesses all things.

Continuity of *being* and of *action ;* in the Supreme, and in the finite. (§ 73–84.)

XII. Continuity of Goodness.

How essential goodness goes forth into the *actual ;*

Without increase, or diminishing, in the Supreme :

But finite goodness *grows,* by continuing ; and by intelligence.

An act may be voluntary without deliberation.

Deliberation does not increase with all action ;—

but may become less.

Yet moral goodness cannot be wholly passive.

(Practical summary thus far.) (§ 85–88.)

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XIII. Of HABIT; and the theoretical objections to it.
The answers, from the philosophy of Responsibility.
Habit is *essential* to Responsible agents.
(This seen in all the moral history of mankind.)
Habit may be evil, as well as good.
Yet this hinders not the conclusion as to its ethical import.
The decay of good does not at once abolish Responsibility.
Habits of *Society*.
Why character is to be found in the Moral Agent:
Society is not the τέλος.
PROBATION—in what sense Responsibility is included in it.
Individuality of Probation. Its loftiness and scope.
(§ 89 97.)

XIV. Of Definitions in Deontology.
The Attributes of the Supreme.
(Not of *à priori* definition, like the Eleatic.)
Their simple Ontology with us.
Grounds of Conscious Being re-stated.
Application to religious questions. Present conclusion.
(§ 98–102.)

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IX.

52. A Moral Governing Power, in suitable relation with the responsible agents of the whole human community, and in harmony with the always-true, cannot (for the reasons alleged, § 48) be conceived of as Impersonal. The idea of the impersonal is, however, identical with the unconscious (§ 8); for we have seen that self-consciousness is the distinction between Person and Thing. A person acts, and knows it; and if the Supreme Governing Power acts towards us, and knows it, and knows the fitness of acts, that Governing Power is Personal, and has a character to which ours corresponds.

The Supreme Moral Governor has Personality.

We have already arrived very gradually at the inevitable conclusion, that (the nature of man being what it is, and the facts of that nature being the basis of its science) a Supreme Moral Governor is in such sense necessary, as to be only deniable by those who would reject from human life all that is regarded as moral: and further, we also perceive that it would involve a contradiction to deny Personal agency to this Supreme Moral Governor. But some more explicit statement is now needed. as to the character of this Personal agency towards us.

The opposite supposition involves a contradiction.

53. We first must say, generally, that the Supreme Governor, who is ultimately the Judge and Regulator of the mutual agencies of the responsible world, will judge in reference to the true-always. If it were not so, there would, as we saw (§ 50), be no common ground of judgment, and we might find ourselves misjudged in detail, and the foundations also of Deontology subverted by the Power which was to vindicate responsible action, but which proved to have a different character altogether.

Let any one, indeed, suppose a Supreme Moral Governor without relation to the true-always; there would not only, in that case, be no ground for any appeal to our consciousness, or our sense of responsibility, but the *existence* of any such Supreme Governor would have to be first established on distinct grounds; and even then, a message from Him, armed with external authority, real or apparent, could only overawe, stupefy, or terrify; but could obtain no moral acquiescence. To separate fundamentally the character of the Governor and the governed, is no less than to render impossible all moral correspondence and terminate at once all possible responsibility.

There is correspondence of character in all moral beings.

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54. To say this is by no means to assert equality in all moral respects among beings of a moral nature; for we recognize, in fact, very wide differences among responsible beings; in some a high degree of perfection, in others great imperfection; but the higher are still in some correspondence with the lower, and they may take cognizance of each other, and each have relation to the ideal perfect (§ 29). And thus, though there can be no limit to the Perfection of the Supreme, there seems no reason why He Who is infinite should not use the forms of the finite, nor anything to hinder us, who are finite, from leaning on the infinite (§ 30). Our Deontology demands that the Supreme Governor should really deal with us, and we with Him: and Religion asks no more.

and therefore in the Supreme Moral Governor and the governed.

55. It is quite conceivable, it may be even probable, that the character and dealings of the Supreme Ruler of moral agents may be partly withdrawn from the scrutiny of some, if not of all who are governed. The reality of His relations with us is not overthrown, however, by any intellectual difficulty among us in apprehending them; enough being known to sustain in us the conviction, that "the Judge of all the earth will do right." But there is great ethical danger in allowing speculations, or illogical attempts to understand this subject, to pass unquestioned; because every moral agent practically assumes for himself a philosophy of some kind, and is soon injured in his responsible action by taking an erroneous and plausible theory. And, indeed, speculations concerning the Supreme are also *facts* of our moral history, of too wide a kind to be left unexamined by us, who profess to be ascertaining "facts of human nature."

The reality of the dealing of the Supreme Governor with the governed.

Speculations concerning this, do not disprove it.

They are not, as too often supposed, merely wilful efforts of wayward thinkers: these inquiries, and these resulting theories, remind us that a reasonable and responsible being aims to see both his reasonableness and his responsibility.

56. The speculations as to the character and dealings of the Supreme Governor, or God, with us whom He governs, naturally range themselves in two groups, according as they belong to our relations to the "true-always," or to our relations with "phenomena." The former are commonly spoken of as Pantheistic, the latter as Humanitarian, if we may take the description of either from the opponents.

Two classes of such speculations,

On the one hand it has been doubted, whether we can have any real knowledge at all of the Supreme Governor,—knowledge not being predicable *univocè* of God and man. On the

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other hand, it has been affirmed, that our knowledge of God may be limited to the phenomenal, and yet be true, and not merely adequate to present need. The antagonism of these views is superficial. The "Regulative knowledge," to which the former would confine us, could not of course be imagined to be out of relation with the "true-always:" and the Anthropomorphism, which would be content with the phenomenal, could not afford to give up all that lies beyond phenomena. There is little, then, to choose between the philosophy which denies us the real knowledge of God, while giving us a substitute for knowledge suitable to our present state; and the philosophy which would regard the Divine being as "altogether such an one as ourselves."

more apparently than truly antagonistic.

57. It is undeniable, however, that both these philosophies have possessed themselves of that ground which it is our business here to traverse. As an example of a development of the former, we may take a passage from an eloquent prelate of the last century:—

Both these speculative philosophies are prevalent.

"Shall I affirm, O God, that Thou wast before my existence, even from everlasting? No: I must not place Thy being in such relation with mine. I must not say 'Thou wast,' for that would mark succession, and time past. Thou ART, and it is only an immovable present, indivisible and infinite, that I may ascribe to Thee. It must not be said that Thou hast always been, but that Thou art. For this term 'always' would not describe permanence, but continuity. And what I have said of the past, I may say of the future. It is not Thou shalt be, but Thou art. The stream glides along the bank, but the bank moves not. It has but a motionless relation to that which flows by."

Example of the Pantheistic pietism.

The entanglement of thought here will be found most extreme.

58. The following, however, taken from a well-known religious writer of our own day, while exhibiting the recoil in some minds from this Pantheism of the assertors of the "unknowableness" of GOD, equally confuses the phenomenal with the true-always:—

"'He is not far from every one of us, for in Him we live, and move, and are' . . . . . I conclude, then, that St. Paul regarded this statement as the one great protest against Pantheism. . . . . And here is a sentiment of Aratus, which may be turned to either account. It may justify the old Homeric notion of men having a Divine parentage. It may assert the proud notion of sages 'that men by wisdom can make themselves gods;' 'for we also are His offspring' . . . . . The Apostle cannot urge the Athenians to abandon idolatry, he cannot urge them to make that change which involves such a convulsion in the whole moral being, which cuts asunder so many links of old affection, if

Example of the Humanitarian view.

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the doctrine of their poet is not true, if they have not a right to claim God as related to them,—God is, in the strictest and fullest sense, their Father. I say again, in the *strictest and fullest sense;* not in some vague sense, which is, indeed, Pantheistical, a sense which represents Him as the Father of all cattle, and trees, and flowers, and therefore their Father. The argument would be utterly worthless and contemptible if that were his meaning," &c.

59. These two pious writers seem, no doubt, to be widely opposed to each other, though both "seeking after God." The one earnestly denying in terms all real correspondence between God and man; the other asserting paternity and sonship, "in the strictest and fullest sense." Other and familiar instances will occur to many, of a like fatal influence of the old ontologies on modern theology; but enough now appears, from the facts before us, to show the impossibility of avoiding in this inquiry a careful consideration of the relations between ourselves and the Supreme. It is not enough to give our emphatic refusal to the conclusions of Pantheism, or of Anthropomorphism, as to the Divine character, if we are holding to the premisses which may lead to the one or the other. We will look then at those premisses.

We must not accept the premisses and deny the conclusions.

X.

60. The doctrine of the old Peripatetics, which had so exalted the perfection of the Divine nature, Τὸ ὄν, as to deny to it all that we mean by the terms reason, intellect, or being, on the ground of their implying imperfections, was yet, to a great extent, adopted by the Christian schools. Not considering that to deny the Supreme Being all relation with the finite or phenomenal must be to deny Him all intelligent control of the world, if not to deny Creation itself as His act, the Christian schools were soon attracted by the apparent sublimity of such speculations as to the Perfection of God; and, unwarned by the heretical affinities which had once marked this as the philosophy of Arianism, they gradually resolved all our thoughts of Divine Perfection into a "simplicity" which nearly attenuated the Divine Being into nothing. The train of thought which terminated in this has, it will appear, a singular mixture of the materialistic and the abstract.

Early speculations as to the relation between God and man.

Admitted by the Christian schools.

61. It was the doctrine of Parmenides, transmitted and transmuted (as we shall see) by the Alexandrian scholastics, that

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it would be a degradation of the Supreme to think of Him as simply being, or containing, the sum of the Perfections known to the mind of man; since He must be far above them. This was the original error of the Philosophy; for thus it interpreted Perfection in relation *only* to the phenomenal, not distinguishing the true-always. To think thus of the perfection of the Supreme Being was to err still further, by depending on some artificial distinctions as to time and space; and regarding them physically. "Time and space" (it was said) "imply diversity, continuity, extension, division. Since God is One, and Perfect, He is above time and space, and exists apart. All movement and all action imply time and space, and these signify limitations," &c.—

Parmenides and the Eleatics.

(Here there is another confusion of thinking to be pointed out, because if space exists, it *co-exists* in all its infinity, and time does not, for time marks *sequence* only. Every phenomenon, of course, has relation to both time and space; but the true-always has no necessary relation, *à priori*, to either. Both time and space are conditions of the phenomenal, or of the abstract when in relation with the phenomenal.)

62. Proceeding, however, from this, the Eleatics would go on thus :—

"If the Supreme be Infinite, how can the Infinite have movement? And is not even Thought a kind of movement, having beginning, and progress,—priority, and subsequence? Then how can thought be attributed to God? If He thinks, He has but one thought; and if He acts, He is pure act, ever going forth and never changing. Then it would seem that His Act exists not apart from Him, for He is Infinite, as has been said. Can He, then, have any movement? Does it not imply change of Relation, if not more? A movement from better to worse is inconsistent with the nature of a Perfect Being; but movement from worse to better no less denies the original Perfection."

The logical tendency of Pantheism to Atheism.

(Here the more than double sense of "movement," or κίνησις, vitiates all the reasoning—interior and exterior movement being confounded—the movement of consciousness and the movement of action—the ideal and the physical.)

63. In these speculations it would almost seem that there is no escape from a denial of Him whom we have to recognize as Supreme Moral Governor! Their Supreme has no past, no future, no retrospect, no prospect, no thought, no deed! Can He deliberate? That implies a waiting for phenomena, which is hesitation. Can He resolve? That implies previous indecision. Can He judge? Then must He not poise the pheno-

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mena? In every mental movement some accompanying defect thus warns us that it cannot belong to this Perfect Supreme Eternal Being! There is even an essential contrast alleged between the finite Conscious Agent and the Supreme Being. For our consciousness is a present fact; and the past and the future would be blanks to us if we could remember nothing and expect nothing. But the Infinite Being ever is: unlimited, untouched by others. Being perfect, can He remember? can He expect? If not, once more, what correspondence is there between Him and us?

The confusion is in the premisses.

64. The fact, both on the surface and deep down in all these confused investigations, is that man cannot but "feel after" the Supreme, however blindly. The further fact also, which our previous analysis has taught us, no less appears, viz., that these uncouth conclusions result from a failing to distinguish the essential relation of all conscious agency to the true-always (§ 29). The Eleatic philosophy assumes (what nothing but an exhaustive analysis of such ideas as "Being," "Thought," and Volition" would justify) that the *finite limitations of our ideas are essential to them.* Evidently, however, there always remains something beyond the ideas and phenomena which we explore, and therein would be a basis of correspondence between the Supreme and the finite conscious agent: so that the Eleatic analysis is not only defective in principle and method, but wrong in fact.

Inaccuracy also in the inference itself.

65. A consciousness transcending the phenomenal is a great fact on which our whole investigation here rests. If the conscious agent were even admitted to find himself always in juxtaposition with some phenomena (which is far from indisputable, as to the whole interior world of reflection and *à priori* assumption, § 26), yet he is not identified for a moment with the phenomena. If we are conscious at all, we know that we are not identical with anterior being, and that the phenomena and ourselves are not the same. The universe may (as has been said) be affirmed to consist of the "perceiving and the perceived"—the conscious agents and the phenomena.—Even the final dissatisfaction of the conscious agent with all that is merely phenomenal is itself a sufficient fact for the purposes of the present part of our argument.

The conscious being is not to be confused with phenomena.

(On *Final Causes*, p. 41.)

66. The Eleatic philosophy could not, from its interior unsatisfactoriness, be transmitted without change. Its conclusions were such as the human mind in fact resisted. Among the Latins it was regarded as

The Eleatic Philosophy modified.

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a literature; and might amuse them; but it had no influence on thought. After the Christian era, it was of necessity re-examined. (Cicero's *Tusc. Qu.*)

The Neo-Platonicians soon felt the impossibility of separating, as the Eleatics did, the Divine Being, or Supreme, from the universe of existence and thought, and for some relief recurred to the Platonic doctrine of a Trinity, though modifying Plato in a way we must not here stay to explain. They attributed Energy, Intellect, and Creative Power to the Second Hypostasis of their Triad, the "Demiurge," as they said, who had Unity with the Supreme, essentially, but also had in common with us the attributes of intellectual existence. This, however, was but removing the difficulty a step further back; for if movement, thought, and action were inconsistent with the Supreme Perfection, how could this Demiurge have proceeded from the Infinite One, or Supreme? Would they suppose the Demiurge came into action or being without the knowledge and will of the Supreme? This they must have been reluctant to say, because it would destroy the Supreme Unity. Neo-Platonicians. (C. Morgan on the Trinity of Plato.)

67. The early Christian doctors found the difficulty at this point. The field of speculation was occupied by the Heathen theosophists, Plotinus and his friends, before the exacter Christian statements of the relation of man to the Supreme (through the Incarnation) had been formulated, and during the second and third centuries the struggle between the Church and the Philosophers was an earnest one. The Christian doctors before the *Nicene age: comp.* with the Enneades.

These Christian doctors did not gain the mastery without accepting much of that philosophy of the old world. They appropriated, and tried to consecrate some of the terms of the Alexandrian School, and (at the frequent risk of Arianizing) they at length attained, though imperfectly, some philosophy of Dogma. The Greek language which they used became at a later day the medium of Athanasian thought, as no other language could be; and the Church thus effected the conquest of Pagan Philosophy, by the time of Justinian,* who closed the old schools for ever.

* A.D. 529.

68. But during the preceding century the Latin Church and the Latin language had further predominated in the West, after the transfer of the Greek to the East in the time of Constantine. The Latin fathers necessarily accepted the Ecclesiastical philosophy of the Greek doctors in a somewhat hard and mechanical way. Even the genius of St. Jerome or St. Augustine availed nothing to avert the conse- The post-Nicene Chris-

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tianity more Eleatic.

quences. They yielded like the rest. The Eleatic ontology was indeed too closely allied to Predestinarianism to fail to fascinate the Doctor of Grace, and a great modification ensued in all the Latin world, of the Christian idea of the relation of man to the Supreme. The Eleatic and Christian elements, which had coalesced before the Nicene era, with a predominance of that which was Christian, united from the time of St. Augustine, with a supremacy of that which was Eleatic.

69. It would be a greatly interesting pursuit to trace onwards from St. Augustine's time and the great Council of Orange to our own days the influence of that old heathen philosophy, its tyranny in such minds as Prosper's, and Bradwardine's, and Calvin's; its milder but not less real influence in Anselm, Bernard, or Jansenius. We should see the same forgetfulness of the true-always, the same domineering of the phenomenal. But it would be beside our present object. The Church (divinely guided, we believe) always resisted any development of the Eleatic spirit when it threatened to be formally heretical; yet the Church never exorcised it. And among the philosophers, as yet, the relation of "knowledge" primarily to the true-always, and secondarily to the phenomenal, was critically undistinguished.

Progress of Eleatic thought in the West.

70. Aquinas among the Scholastics, and Calvin among the moderns, give us perhaps the fullest view of the hold of the Eleatic system on the Christian theology. The former, of course, is more complete and exact—(indeed, the latter declines to think it out). From the old notion of the immoveableness of God, Aquinas deduces His eternity, His unchangeableness, His simplicity. This "simplicity" nominally differs from the Eleatic, by asserting that it includes Being, Thought, and even Act, instead of excluding them. But while thus asserting the Being and Intelligence of God, Aquinas is obliged to maintain that "Power" is not strictly to be ascribed to Him. In any compound Being, he says, Act stands related to Power: but God is a Simple Being; and His Act is to be regarded as Pure Act, one with, rather than a result of, Power.

Mediæval and modern schools.

One philosophic error at the foundation of all this distressing verbiage is that Conscious Being may be subjected to analysis or definition, as if composite. It is forgotten that every Conscious Being has essentiality beyond the range of phenomena, and is in relation with the true-always. He is not a phenomenon, *quoad essentiam*, even to other conscious beings; except in some sense to the Supreme, Who is Governor of all, and, by the necessity

The foundation errors of this philosophy.

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of the case, understands the beings and phenomena of the Universe which He governs.

71. We thus finally perceive that the philosophy which supports alike the Mediæval Pantheism and the modern Anthropomorphism is unwittingly but wholly based on the denial of the grounds of conscious moral agency,—its twofold relation to the true-always, and to the phenomenal.

The Responsible Conscious Agent, we again see, ever demands a correspondence between himself and his Supreme Governor, and cannot be deterred from demanding it by any unreal speculations. His own connections with phenomenal existences he must have, of the same kind as those which are discerned by the Supreme; otherwise the Supreme would be judging one thing while the Finite agent had been acting another. If his relation with the true-always is not the same as that of the Supreme (though it differ in degree and intensity); he would be judged (we repeat) on ground different from that on which he had acted: which is absurd, if the Supreme be a Moral Governor (§ 54). And supposing the Eleatic ontology, proceeding from the Divine immoveableness, had a kind of truth in relation to the true-always, it had none in relation to the phenomenal. It may be that the true-always has no change of "past, present, or future"; but this cannot be with the phenomenal which is the sphere of the contingent. We have no reasonable alternative but the rejection of the Eleatic principle.

The Eleatic premisses must be rejected.

72. All that we have seen as to Contingency must here be borne in mind. It must not be admitted *pro formâ*, and then laid aside (§ 23). It is irrational to say that in contingent and phenomenal matter there is "no past, or future" with God. The Divine immutability, and co-existence, is in the relation of the Supreme Conscious Being to the true-always; which is doubtless essential. We cannot, on the one hand, deny the relation of the Supreme to the phenomenal without denying Him to be the Moral Governor Whom we need. We cannot, on the other, deny His relation to the true-always, without denying Him that which pertains to the essence of consciousness, whether in the Supreme, or in man, His finite "image."

XI.

73. To proceed:—

We have found that whether in the schools of old Athens, or in the museum of Alexandria, or in the cloisters of

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Christendom, or in the halls of modern opinion, the conscience of man refuses to be kept from the idea of Duty. It only reasonably seeks for the development of Duty in dependence on the facts of our being, and (we must repeat) beneath the Government of a Supreme Ruler, whose Character, like our own, is in relation with the true-always, and who is able to deal with contingencies of the phenomenal world.

Finite dependency and its sphere of action.

The range of conscientiousness must thus, it appears, extend to all action of which the Supreme Governor will take cognizance —that is, all action which may touch the condition of other moral agents around us, or may personally re-act on ourselves. There is no narrow limit here. The conscious moral agent must recognize the same ends, aim at the same objects, as the Supreme Governor will ultimately approve. If we assert accountability at all, we can exclude nothing of which the conscious being takes cognizance. Even Religious Accountability—which we must reserve for consideration—must be founded in the reason of things, and not be merely authoritative; fundamentally it is of the same kind as what is commonly called moral—(ὑπεύθυνον).

The conscious agent must recognize the same ends as God approves.

Hence the largeness of the range of responsibility.

74. The relation once established between the Moral Agent and the Moral Governor, abundantly suffices for the final solution of all the difficulties which we first confessed to lie in the idea of Responsibility (§ 10, &c.). It elicits the fact that we really depend at last on the Supreme, for a complete issue of our *de facto* responsibility. And this "dependence" on our part would seem to correspond with Providence, Guidance, Help, Protection, as far as morally necessary, on the part of the Supreme Governor: in connection with which would arise various phenomena of the religious life, referred to in a future page.

What relation of dependence on the Supreme implies.

Higher and specific relations between the moral agent and the Moral Governor cannot be set aside in consequence of any collateral difficulties or objections. How far some more refined or developed moral conditions, such as Devotion, Gratitude, Reverence, Dependence in detail, are natural, and how far acquired, may be matter of just inquiry; but it must be remembered that our capacity of acquiring them is a generic fact of nature; and they are incorporated with our responsibility, whenever conscience really adopts them.—Of course mere opinions floating on the surface of the mind are not here referred to; they are not convictions: but faith or principle touching the inner life, or conscience, cannot be ignored.

Acquired relations not unnatural,

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75. It is evident, however, that this fact of Dependency on the Moral Governor (as well as those specific relations referred to), must imply some *diversity*, as well as a *sameness* of moral nature. The relations between the superior and the inferior must needs be regarded from two points of view—something being always implied on the one side which could not be on the other.

and imply diversity as well as sameness.

We must, therefore, in our attempt to apprehend the moral goodness which man is to aim at and which the Supreme will approve, mark these diversities or distinctions, as well as the acknowledged sameness: and for this we must go back to what has been already premised (§ 29) as to the beginnings of good in the moral agent.

Further analysis of goodness.

76. We said: "In the power or capacity to fall back on his own relation to the always-true, and to decide from his own resources,—in this, and in this alone, can we uniformly trace the beginnings of that good which, in action, we call moral, and which is distinct from the agent."—We must analyze this next.

Some finite beings are capable of moral goodness; and some are not. Inferior ranks of beings may have excellence of their own, *i.e.* fitness to their end; but it is not moral, if unconscious. They are excellent as Things. When, however, we speak of a conscious responsible agent as "capable" of determining good action, and so beginning it, we, at once, suppose that he can also determine evil. A finite being capable of goodness which is to be praised as voluntary, discovers that he is capable of some limited action of his own: he falls back on his own powers. In this capacity lies an alternative. There is "may be" or "may not be." He is not an agent *necessarily* good. His capacity for goodness is itself a good, but that is in another sense; that is not a good for which *he* is to be applauded.

Beginnings of goodness in the moral agent.

77. But how, on the other hand, can we estimate the goodness of the Supreme? We cannot even think of it as other than essential to Him. It would be impossible to attribute to Him a *capacity* for goodness, in our alternative sense; for that would be finite: but He must be no less than Supreme Conscious Good in essential and eternal relation with the abstract, the true-always. If He were not such, we reiterate, He would not be that Supreme Governor which true moral responsibility demands (§ 48).

Compared with the Supreme Good.

Here then we have an original distinction between the Supreme and ourselves; and it results from His being Supreme. In Him there is no beginning to be good; as being Supreme, He ever exists, and is ever good. His fitness of Being is eternal.

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The opposite thought—that He ever had been evil,—a being with no fitness to be,—were a contradiction as well as a blasphemy. He is thus Governor of all: His mind being in essential relation with the true-always. His action towards finite conscious beings and towards the phenomenal universe, must accord with His own nature as good; it must ever be so, for He is perfect, and not affected by habit (§ 48). We conclude, then, that the highest goodness is NECESSARY GOODNESS.

The highest goodness is necessary goodness.

78. In what sense, then, we next ask, is the Divine Goodness voluntary, and not fatalistic? In what sense, *i.e.*, is there any moral correspondence here between the goodness of the Supreme and the goodness of the finite responsible agent? In this, as in all analysis, we must proceed from facts near and easily known to those which are more remote—from the γνώριμα ἡμῖν to the γνώριμα ἁπλῶς.

How also voluntary.

In examining our own voluntary action we found (§ 16) that the interior essentiality or power of any being is not a hindrance to the fact that he may act freely according to his own nature. The freedom which is essential to goodness is only interfered with when there is external compulsion. But this is inconceivable in the case of Him who is Supreme. Therefore His goodness is voluntary in act, though His nature is necessarily good. The conclusion is not to be avoided.

Interior determination does not hinder voluntariness.

We may even, with all reverence, add, in reference to the Supreme, what we said of the finite conscious agent, that the doer of any act has himself placed a limit, so that, as the old poet says,

μόνου γὰρ αὐτοῦ καὶ θεὸς στερίσκεται
ἀγένητα ποιεῖν ὅσσ' ἂν ᾖ πεπραγμένα.—*Agatho.*

(*Eth.* vi. 2.)

79. But the point now arrived at is far too important to be thus passed from. In comparing the Goodness of the finite agent with the Goodness of the Supreme we distinguish that which is *quoad naturam* from that which is *quoad actum*, and we find throughout, what has just been intimated, that the difference lies, fundamentally, in the Finitude which characterizes us. We personally have had a Beginning: goodness, thought, will, action, all have had beginning in us. The Supreme, the ever-perfect, has ever been, ever thought, ever willed, ever acted, *quoad naturam suam*, even prior to and apart from phenomena. Of course it would be impossible to predicate of any one act of the Supreme that it "has ever been," if we speak of acts in relation to phenomena—which might be

Distinctions of the finite from the Supreme marked by the Finitude *quoad naturam* and *quoad actum*.

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creative acts—for that would be to regard creation as co-eternal with the Supreme agent, which is a contradiction; but some act of the interior being of the Supreme would needs be "as with Him." Any other conclusion seems a negation of His existence (*Prov.* viii. 30).

The confusion of the conscious agent and the phenomena is atheistic.

80. Now a finite agent sooner or later reaches the limit of his capacity. "My goodness reaches not to Thee," is his natural language towards the Infinite, or the Supreme. First our consciousness is limited; and next all our relations with the phenomenal are limited. Hence we are soon conscious of what we call "imperfection." (But imperfection attaches in this case to the limit, and not necessarily to the quality of the act so limited, which may be conceived as entirely good as far as it goes.) (§ 63.)

Finitude suggests imperfection.

If it be said that we cannot conceive of any finite goodness, apart from its limitations, still we can mark the limitations, and perceive that they are no integral part of the *idea of good*. The goodness of character, or of action, is *not the same as the circumstances* in which we find it. Indeed, the same character of good may be found in different circumstances; the same relation of good may exist with diversity of particulars; and like acts of good may proceed from various agents. The particulars of action elucidate the goodness, but the goodness has a reality of its own.

But the idea of the good is distinct from that of the limit (p. 36).

81. And from this it again follows, that to attribute the same moral nature to the Supreme as to the finite conscious agent, is not to attribute imperfections found co-existing with finite goodness or powers. And also, on the other hand, our finite power may even be exerted in imitating a goodness higher than our own; and the Supreme may reasonably direct us to be "perfect, as our Father in heaven is perfect," — "holy, as He is holy," — "righteous, as He is righteous,"—"merciful, as as He is merciful." He deals with us as conscious beings in relation, more or less perfectly, with the ever-good—the true-always—and having to take cognizance of it in all our dealings with the phenomenal.

The relation of the Supreme and of the finite to the true-always, untouched by the differences.

The Divine relation to the true-always, we have said, is *essential*, and never began to be. But our relation to the true-always is also essential, pertaining to consciousness, but with this difference, that it *began to be;* it is limited also, and not perfect. But the relation of the Supreme to the phenomenal must not be confounded with His relation to the true-always: for that would be

Relation of the Supreme to the phenomenal.

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to make the universe eternal, the phenomenal absolute, which is a contradiction.

82. Now the relation of the Supreme to the phenomenal involves the question of the continuous knowledge and goodness, as well as action, of the Supreme. We cannot question that God knows, perfectly, the phenomenal world; and we know it imperfectly. He knows it as it is; we aim to know it as it is. It has not ever been; it exists in succession, and God knows its phenomena as they are. To say of the true-always that "there is no before or after with God," may be intelligible: but to say of the phenomenal world, that "there is no before or after with God," is equivalent to saying that the Supreme does not know the world as it is. His knowledge of the phenomenal is co-extensive with the phenomenal and possible. Our knowledge of it is so limited that, at times, it with difficulty reaches even to the probable (§ 29).

The bearing of this conclusion on any theory of the prescience of the Supreme will depend on our accepting the fact of contingency in the phenomenal world. This subject also must be deferred to the definitely *religious* part of our Analysis. We are here ascertaining principles. To think correctly as to the phenomenal, we must, however, here call to mind that contingency, as we dealt with it, lying among the foundations of our responsibility, was not an abstract contingency merely, which would amount to no more than that an action, or event, might be conceived *à priori* as not to happen: but what we said had reference to action of conscious *agents*. The contingency spoken of plainly meant that we are previously certain, that an act may never *de facto* come to pass, or that it *really* may come to pass; and that it is the moral agent who *ex seipso* determines which it shall be, and is responsible accordingly.

The bearing of this on moral contingency.

83. But in examining the relation of the Supreme to the *phenomenal in finite action*, we must fully confront this fact of *continuousness*; for Christian Eleatics still deny continuousness to the Supreme, to His Being, His Goodness, and His Acts. It is supposed in their philosophy, that as continuity implies infirmity in us, so we may not attribute it to the Supreme. We must repeat our answers. To deny, as they do, continuity to God is to separate Him from the phenomenal universe, and affirm that He may be an Eternal Conscious Being, in lone relation with the true-always,—a Deity inaccessible to man and ignorant of us—and therefore not Perfect, *i. e.* not Supreme—which is a contradiction. But in asserting continuity as to the Divine Being,

The relation of the Supreme to the *continuous*.

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and His acts towards the phenomenal, we can exclude, of course, all the defects which may in us accompany continuity, but cannot in Him, because He is Perfect. It is to believe that the Supreme in His own sublime way possesses all things. "Thou remainest ever!" (*Heb.* i. 11); "Thou continuest holy" (*Ps.* l. 3). The Supreme possesses all things.

It is surely also reasonable to affirm of the Supreme Himself everything good in the finite (whom He has to govern), without defects and limitations; for otherwise we deny Him everything we know, lest we should impute to Him our "infirmity," and thus in such denial we should deny the Moral Governor altogether.

84. Our nature, as men, is such, that we can never be persuaded to accept a philosophical sublimity, indistinguishable from a denial of the Supreme, when there lies before us a reasonable conclusion from the facts of our responsibility that there is a Supreme Governor, Who has continuous existence, while in essential relation both with the true-always and with the phenomenal; Who has continuity in action, without division of energy,—Who continually wills His actions, with no infirmity akin to human deliberation: in a word, Who is "from everlasting to everlasting," "Who was, and is, and is to come," lives in the past, upholds the present, and rules the future, according to the proper nature of each. Continuity of being and of action.

Here, at least, is a sufficient conclusion as to the Continuous Being, Knowledge and Action of the Supreme; but we must attempt a closer consideration of Continuousness of Goodness.

XII.

85. The Goodness of the Nature of the Supreme we saw to be necessary Goodness; yet it was voluntary (§ 78). But the Supreme acts; and He wills before and while He acts. His Goodness, as Supreme, never began to be, His nature being ever in perfect relation with the true-always. But *His outgoing acts begin to be* as He directs, in succession, or simultaneously, according to His purpose or good pleasure. There is no incongruity in speaking of out-going acts of the Supreme, unless we mingle with our notions of infinity the physical idea of extension, which, if not a contradiction of all we know of conscious being is, as yet, quite gratuitous. Continuity of *Goodness*.

That fitness, or harmony of being, which, whenever known, would fill each pure Intelligence with satisfaction, each conscious

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being with joy, is what the word "Goodness" may express. All feel that they have, more or less perfectly, essential relation to it. The nature of God has changeless possession of all that is true and beautiful to our consciousness; and the action of any being—so also of God—flows from his nature. That goodness of the Divine Nature is a perpetual complacency of Being, and in all its manifestations in phenomena it is "very good," as He is Highest Good. But these manifestations must be continuings of good. The phenomenal world is full of the out-going goodness of the Supreme, who is an ever-manifesting, never diminished, sun in the moral firmament. Being Supreme, and Perfect, His Goodness can know no increase essentially; but it is ever fresh in manifestation with the ever-advancing phenomena of the universe; though it is, in His consciousness, without addition.

How essential goes forth into the actual,

86. Now here is a new point of difference between the Supreme and the finite conscious agent. The Supreme cannot be *more* good; the finite *can*. Our character is affected, as God's is not, by the fact of *continuance*, both of being and of action. However good a finite nature may be in its beginning, however truly responding to the always-true, it acquires power by *continuing* good. And continuing acts of good are ever increasing developments of the power of the conscious finite agent. Continuing in goodness is, for us, advancing in goodness. It is *better* known the *longer* it is known.

without increase or diminishing in the Supreme.

Our advance in goodness is intelligent. If each act towards the phenomena be intelligently done, it often has more strength than the preceding act. Wavering between good and evil is found to be no part of the perfection of choice. It would not commonly, or ultimately, be so, with any good agent. Deliberation, as it often with us accompanies choice (that is, we pause while we choose), arises from our not knowing details. But the Supreme always knows. He wills without a doubt; He chooses the best ends, for He knows all.

But our goodness grows by continuing and by intelligence.

87. Not that deliberation essentially accompanies choice in the finite agent. The continuation of choice may generally be prompt and immediate. Voluntariness in action at length implies simply satisfaction in, or love of, that which was originally chosen. And herein some additional light is thrown on the inner nature of voluntariness. The act of either the Supreme or the finite agent is truly voluntary, if it be that which he is freely pleased to do. But the act of the finite agent is in fact ultimately

An act may be voluntary without deliberation.

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affected by Habit; and that cannot be with the Supreme, who is already Perfect. The finite may advance in goodness towards the infinite; and, as our actions flow from our nature, the character which we have becomes ultimately modified, and finally fixed to a great extent by our own course of action. It is evident too that our responsibility is thus thrown, to a larger extent, into our own hands for its results. It is only, then, of the Supremely Perfect that it could be said that His nature is not intensified by His acting. As a fact, however, there is less and less of deliberation in the volitions of advancing moral agency, whether for good or evil; and the highest kind of finite goodness in action becomes more and more like to "necessary goodness." Habitual goodness tends to rise towards the Supreme Goodness, being more pleasing, and less and less liable to change, in every successive course of existence. The goodness of the best conscious agents would seem to begin from deliberating voluntariness, and terminate in perfect habit.

Deliberation does not increase with action.

88. We may be reminded that a finite conscious agent being originally good, as nature is good, his continuing in goodness might be conceived to result wholly from new gifts of a sustaining kind, not acquired by him, but in some way coming to him. But, we reply, his goodness would then be passive, and subside to the non-intelligent. For finite moral goodness cannot be conceived as wholly inactive. Also the moral agent, having a capacity for action, must not decline to go forth into action, since so declining he would violate his nature. So then his continuing in goodness is *his own advance* towards the Perfect Good.

Yet moral goodness cannot be wholly passive.

And here, to fix the conclusions arrived at in any one's thoughts, after his reconsidering all the moral foundations of the present analysis, it may be well that for himself he should ascertain whether (as a believer in goodness) he can possibly arrive at any other result? Especially as to this last section of the Analysis, let him settle:—

Practical summary thus far.

[1] What he means by moral goodness? [2] Its nature in the Supreme, both as to its sameness with, and difference from, the finite? [3] Its beginning in any being? [4] Its Continuance? [5] Its Voluntariness? and [6] Habit?

XIII.

89. And now once more:—

We have marked the effect which is produced on the finite conscious agent by continuity of action. We find that goodness may acquire gradually a higher character in him.

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But then, its relation to volition still may need examination: for it has been represented by some, that by the acquisition of habit, the agent gradually *withdrawing some voluntariness* recedes from virtue. This objection, however, arises from forgetting, that though deliberation is an ideal condition of finite goodness aiming at higher goodness, yet (as has been seen) the higher goodness is the "good-and-true-always," concerning which deliberation has no place, though there is the choice of satisfaction. Deliberation at all times is in the sphere of the phenomenal.

Of habit and the theoretical objections to it.

But the most effectual answer to this objection to habitual virtue will be found in the facts of Responsibility. Ask any one to try to conceive the opposite thought, viz., a moral system in which repeated action had *no* effect on character; in other words, *formed no habits*. In this case, our characters would always remain the same as they were at the beginning of our existence. A good man would mean, a man formed at first with a good conscious nature, which would act mechanically (if that be not a contradiction). A bad man might mean, one who in some unknown way lost his original nature.

The answer from the philosophy of Responsibility.

90. Nor would it seem, in the latter case, that lost goodness would ever be recoverable. No series of acts in a prolonged career would form character. The joy of finite goodness would be sterile, the loss of it hopeless; the finite conscious agent a mutilated and objectless being, in no approving relation with the true-always, and powerless or mechanical among phenomena.

There is no escape from the conclusion that habit—whatever limitations of freedom, or voluntariness it may seem to introduce—is an absolutely essential part of Responsibility, among finite conscious agents. To take the very simplest illustration, it is from this that, in fact, we rely on one who has long continued in goodness, more than we ordinarily can on the neophyte in virtue; and though we do not exclude, even in the best, the abstract possibility of a fall from goodness, we recognize with profound satisfaction the ever-increasing improbability of a perseveringly good man's failure.

Habit is essential to responsible agents.

If, by continuing in goodness we may acquire, as experience assures us, stability, perpetuity, and even a kind of perfectibility of character, then some moral history of mankind seems to be not hopeless. Habit is its very life. Not unfrequently the attempt has been cheerlessly made to treat all morals as matters of opinion, in consequence of the varieties of individual thought, and diverging civilizations;

This seen in all the moral

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but experience has shown that the relation to the true-always survives all the eccentricities of social and individual life. The whole race further secures by habit a permanence of moral sentiment. The phenomenal cannot ultimately change the true-always.

history of mankind.

91. Not that we should overlook, that habit is strong for evil as well as good: that is, if men go on in wrong-doing they injure their own better nature. If a departure from good in action takes place, there follows a deterioration of character, or even a destruction of it; and then to the self-ruined individual the connection with the true-always would be well-nigh obliterated, and "right and wrong be mere matters of opinion" indeed. But this does not refute the broad facts of human nature on which its science must stand. Of course, in looking among the details of the whole history of free agency, we must not wonder if we meet with departures from its best nature. But we judge of that nature itself from its best attained perfection.

Habit may be evil as well as good.

Yet this hinders not the conclusion as to its ethical import.

In Ethics, as in Science or Art, we properly take the best idea,—the most disinterested Justice attained by humanity, the most fearless Truthfulness, the severest Purity, the sweetest Benignity, the noblest Generosity; let us seek for these in the moral history of our race, and we shall best find (far above the region of isolated opinion) that Moral Nature which is the reflection of the image of the Supreme, and the perceptible ground of the Responsibility of the finite agent.

92. It is important to bear in mind at this point, that there is an accelerated ratio in the formation of character in the finite agent. And thus it is impossible to over-estimate the value of the earlier stages of a moral career. Habits may, however, grow, so as to injure our voluntary goodness, for a long time before extinguishing it. Responsibility, even when enfeebled, will remain, and in some degree perhaps to the very last. Question after question for his own practical decision will still inexorably present itself to the most deteriorated moral agent, though every new decision, if wrong, leaves him less free to virtue.

The decay of good does not at once abolish responsibility.

But while he who advances in evil finds each new act is a new chain fettering and crippling his moral agency, so that there needs little foresight to predict his coming ruin; yet the man who is growing in goodness becomes also more and more confirmed in it. As he becomes habituated to good, evil actually becomes more difficult to him, and his consciousness and love of the Supreme Good, and his relation to the always-true more intense.

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93. We have, thus far, in speaking of habit, regarded it as telling on the individual only; but obviously, in a community of conscious agents, all so constituted, the moral agency of every member of the entire society would have to be considered in the same light. A whole people may indeed acquire a *general* character by continuous mutual action, either of a right or wrong kind. "What is usual" is regarded by inferior agents as practically the same to them as "what is right." When the relation of the individual to the true-always has been weakened by personal defects, or ill education, or when any baseness, custom and fashion tyrannize without check, and are taken as law, the whole social condition of a community may thus be so lowered that it no longer affords a possible sphere for a justly responsible agency. In this case, it seems reasonable to think that, under the government of the Supreme Moral Ruler, such a society would soon be broken up: especially as the habits of a community would go on augmenting in fearful proportions.

Habits of Society.

In the same way, however, the habits of a highly virtuous society would be of increasing value to the individual (§ 156). The relation of the individual to a Polity has already been noted (§ 43); but the reflex action of the polity on the individual could not be sufficiently considered without inquiring as to the sort of polity in which moral agency would best be developed for its best ends.

94. For the fact more and more distinctly stands out, that the *formation of the character of each responsible agent* is the work ever going on in this world. No doubt the man is intended to act on his fellow-man;—but for *what end?* So far as society is concerned, it might seem sufficient if the man satisfied the general requirements of the community, as to present and mutual well-doing. The responsibility of each member to the whole body, in this respect, is intelligible, and adequate. But viewed relatively to the individual himself, this will not suffice. He is to himself more than a fragment of a political whole. His ethical convictions are in fact inexplicable to him on a political hypothesis only. The perception of this has led some inaccurate moralists, like Hartley, to represent self-complacency, or approval, as the motive of virtue. But this is shallow. It overlooks the fact, that it is a virtue higher than our own which our satisfaction aspires to. To say that a man must satisfy *himself* is not to say that he rests in his own merits; but that he shrinks from self-condemnation as a pain.

Why is character to be formed in the moral agent?

Society is not the τέλος.

95. We are obliged then to contemplate the moral agent

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still, as he exists in and for himself; for, otherwise, we should imagine every man to exist for others, and no man for himself —which would be impossible: for if the well-being of a thousand men be worth attaining, so also is the well-being of each. Indeed the laws of a community, and the community itself, might have no reason for existence except the *individual*, while his responsibility can in no other way be developed and protected than in a polity.

The perfecting of the individual character being thus the end to be attained, we find that the fact of responsibility, on which we have thus far rested, is not all that is meant by moral agency. The perfecting of a moral being for his own sake is *something more*. The fact that the conscious agent may deteriorate, or may, on the other hand, attain a higher personal relation with the always-true, opens to us another train of reflections. The events of each man's career make proof of him, and we may see at last what he will become. He is, as it is commonly expressed, "in a state of probation." Probation includes responsibility, but is evidently another idea. The probation or trial of individual character has for its ultimate object not the present adjustment of the mutual relations of finite beings, but of the position to be held at last by the conscious being himself in the system of the universe.

Probation includes responsibility; but is more.

96. No doubt many and widely varied considerations may be found comprehended in individual Probation, which as yet we have scarcely glanced at: but the fundamental fact must be, that each conscious being aims, if rightly directed, at a true subordination to the eternal Reason of the Supreme. The finite good must for its perfection ever tend to the true-always.

There is a sublimity and loneliness in the fact of each Individual Probation having thus to proceed towards its end, which wonderfully corresponds with the further fact, that every man in his reflecting moments feels that he is a kind of centre, a secret fountain of being, to which all the phenomenal is but relative. Responsibility to others, praise or blame from others, are just as nothing when compared with his own conscious responsibility to the true-always, his *own* acquittal and his *own* blame within,—all unknown perhaps to every other finite observer. This solitary probation of each conscious being, in the midst of the social system around him, finds alleviation, however, in the protection, and guidance, and ultimate justice, of the Supreme and unfailing Moral Governor.

Lonely in individuality of probation.

97. This, indeed, is the satisfaction which is so needed by the moral agent, that, without it, all would be enigma and

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unjust. The fact that as a conscious being he is already in relation with the true-always, corrects unworthy desire of inferior approval,—as the poet well expresses it :—

> Upbraids that little heart's inglorious aim
> That stoops to court a character from man,
> While o'er us in tremendous judgment sits
> Far more than man, with endless praise,—or blame.

But if this sense of individual probation adds dignity to the sense of responsibility, does it not bring close to us at the same time the fact, that there is nothing in all our present life from which responsibility can be shut out? For though we may not be required to answer to our fellow-man for every opinion, thought, occupation, or aim that we may cherish or pursue among things phenomenal, we have such ineffaceable relation as conscious beings to the true-always, as we can never escape: we are responsible to ourselves, and responsible to the Supreme.

Loftiness of individual probation and scope.

And as the thought of our responsibility first brought us, in our analysis, into the august presence of the Supreme; so finding ourselves before Him now, our most searching thoughts are again irresistibly cast back on ourselves,—for "we also are His offspring."

XIV.

98. It will no doubt be observed, at this stage of our subject, that having approached the consideration of the character of the Supreme from our ethical point of view, we have attempted little definition in detail of what have been commonly termed the "attributes of God." To which, it may be at once replied, that such definitions might be apt to assume more than we know, and would not seem based on those "facts of human nature" which we take as the practical foundations of our Deontology. The contemplation of the perfections of God is indeed elevating and instructive—(even as the examination of special duties between men is of advantage in common ethics). But they would as yet be out of place, since we here sufficiently conclude "that He is not far from every one of us."

Of definitions in Deontology.

(As in the Secunda 2æ of Aquinas.)

Let us see, however, how much has been done in our analysis towards understanding the character of Him "with Whom we have to do." The fact that there must be such a Supreme Ruler of moral agents; that He is a Conscious and

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not impersonal Being, that His nature corresponds with the true-always, and has real relation with all phenomena also; that His nature and ours therefore correspond, with that difference only which belongs to our Finitude and His Supremacy;—all these conclusions are far more substantial than any abstract descriptions beforehand of what men might call "His Attributes." But we have done more than this. We have examined what we mean by Goodness, and distinguished the goodness of the Supreme and the goodness of the Finite, *quoad naturam* and *quoad actum*, both as to the beginnings of good and its continuance.

Of the attributes of the Supreme.

99. We have found, too, that our method has enabled us to expose and reject the old Eleatic and Humanitarian philosophies so inextricably mixed up with all the ordinary disquisitions on the Divine attributes. If we persevere in this method, we shall find that we escape many of those difficulties with which theorists, forgetful of all that Personality involves, have burdened the higher Christian Deontology. Any who would dispute our ultimate and most advanced conclusions must dispute them in the first instance; for we cannot change our premisses, or take that for true in an argument for Responsibility, which is not to be maintained also in Religion, and throughout. Religion and the essential "facts of human nature" cannot be put asunder. Those facts are fundamental.

They are not of *à priori* definition as the Eleatic.

Let any one look into himself, and decide whether the foundations of our argument are even disputable by a rational being? Beginning, of course, from the simplest assumption, viz., that there never was universal Nothing (for if there had been, this present universe could not have arisen), we see, further, there never was Universal Unconsciousness, for the same reason, viz., that if there had been, Consciousness could never have arisen. (§ 9, 29.) It seems, therefore, that the "true-always" is the ground both of being, and of consciousness. No sooner is any being conscious of himself than he is conscious of *being*. Let any one consider therefore whether consciousness does not imply in its essence relation of some kind to the *præcedentia*, the true-always (§ 65).

Their simple Ontology with us.

100. When once we perceive that there must be a Supreme Conscious Being, we find it impossible to question that His relation to the true-always must be perfect. A finite conscious being, on the other hand, directly he knows himself as a conscious being, knows that he has not always been, and that his relation to the true-always is limited, though real and essential. The relation of any

Grounds of conscious being restated.

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conscious being to the phenomenal of course is not essential, *à priori*.

(According to Plato, and even to the later Eleatics and Plotinus, and his followers, the ideal of every phenomenon also has relation to the true-always. This question, however, is not practical; even allowing the case to be as said by them, it would not alter the fact, that the phenomenon, as such, is not essential to the conscious being. And it is indisputable that the ideal of phenomena may pertain to the conscious agent as such; and if so, its relation to the true-always might be remote. But this need not be here pursued.)

101. In fine, the more we know essentially of *ourselves*, the more we shall learn of the character of the Supreme conscious agent; marking as we must the Finitude in every act of our own. It may assist us towards apprehending even the relation of the Perfect Being towards the phenomenal, to observe the moveableness of limits even in our own actions. Every act imposes limits for the time on finite consciousness; we cannot attend to many things at once; but not so with the Perfect Being. We are conscious of needing Assistance.

Admitting these foundations at all, we must not hesitate to treat all Religious questions in the same way as the Moral; that is to say, they must be regarded as pertaining either to the true-always, or to the phenomenal. How large a number of critical inquiries belong only to the phenomenal, and not to the true-always, it will be no little relief hereafter to find. And how deep and satisfactory an assurance may arise from finding the highest truths of our Christianity in the region of the true-always, must remain to be perceived in our later analysis.

Application to religious questions.

Conclusion.

102. Our practical responsibilities, whether moral or religious, doubtless now lie in the sphere of the phenomenal; but our characters, as conscious beings, become elevated by having clearer and clearer relation with the true-always. And we may fitly conclude all that has thus far been demonstrated, by saying to every one who has thoughtfully followed what has here been adduced:—If you would be honest and practical, aim to use rightly the phenomenal, remembering that it is transitory; but aim also, as men, to perfect your conscious relation with the "true-always." This, in other words, is—If you would be worthy of your Rationality and Responsibility, aim at the Religious life, as the only abiding Reality.—But we must not anticipate.

Positivism denies what we mean by Religion, as well as all Causation. We must deal briefly with that hereafter.

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The CHAIRMAN.—I am sure you will cordially return your thanks to Dr. Irons for this second profound and important paper. We must all feel indebted to him for giving us the result of such deep thought and such vast learning, as well as for such an amount of original matter. I shall now be very happy to hear any remarks which any gentleman may think fit to make on this paper; but I must remind the meeting that we are not a mere debating society; that our discussions are intended for use; and that we do what few other societies do,—publish reports of our discussions in full. It is only fair to the Society that gentlemen should bear this in mind, and keep as much and as closely as possible to the paper which has been read in any remarks they may have to offer.

Rev. C. A. ROW.—As I have read this paper with considerable care, I will make a few remarks upon it, being fully aware that, unless one has read it carefully, he will not readily perceive all its importance. And first let me point out that its real importance lies in this,—that the opposite principles to those contained in Dr. Irons's paper are those by which Christianity is attacked in Germany, France, and England. Those opposite principles form the foundation of all the attacks which are made on the authenticity of the Gospel. The paper is exceedingly close in its reasoning, and the principles which it lays down, if we consider them attentively, will go a long way towards reforming the theology of the present day. I only wish Dr. Irons would publish the series of papers, of which this is one, in a very much enlarged form, pointing out most distinctly the position he takes up, and get them translated into French and German. I think they would do a great deal of good, as showing the grounds upon which we can argue against the infidel philosophy of the day. The metaphysical philosophy of the present day tends to attack revelation; the principle of that philosophy is in opposition to certain facts of revelation, and tends to the direct subversion of the Gospel of our Lord. I should like to call the attention of Dr. Irons for a moment to one thing, which I believe he has omitted in this paper, and which I believe properly belongs to this, and not to the next division of the subject; that is, that our responsibility is largely affected by the conditions of our birth, and by the society in which we are born and brought up. It is obvious to any one who reflects upon it, that the conditions under which we are born do produce a most prodigious influence upon our subsequent life. You and I have been born English men and women, and, as a natural consequence, we grow up with a certain character and style. Had we been born in Bengal, most of us would have grown up much like the Bengalese; and this runs through all life,—so that the conditions of our birth, the society in which we are placed, and the tone of thought to which we are exposed, produce an immense effect on our whole moral and spiritual being. In the same way the learning of a language influences us to a very considerable extent. Language is a complete storehouse of all the previous thought of men; and when I learn a language, I learn at once certain moral principles, which get deeply impressed on my being. In fact, the whole previous experience of a race lies embedded in a

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particular language, and that does largely affect our responsibility. I think I see the position which Dr. Irons assigns to this point in his paper, but I should have liked him to have been a little more distinct upon it. There are several passages in the paper of which I strongly approve, and which I think are exceedingly important. For instance, Dr. Irons says :—

"To separate fundamentally the character of the governor and the governed is no less than to render impossible all moral correspondence, and terminate at once all possible responsibility."

That is most important, and I endeavoured to lay down the same point in a paper which I read to this Institute on a former occasion. It seems to me of the highest possible importance that we should perceive clearly that, unless we can conceive clearly of the Governor of the universe as having certain moral principles similar to those in man, all responsibility must end. The next passage to which I will refer is the extract from Fénélon, and that is worthy of our deepest and most attentive consideration, as embodying the assertions both of theology and philosophy that the only conception of the Deity is a present existence, and nothing beyond it relating either to the past or to the future. Dr. Irons, I am glad to say, has virtually attacked many prevalent opinions and errors in theology as well as in philosophy. I think it is only fair to Dean Mansel to say that he has brought this same point out in some degree in his Bampton Lectures, and has shown that if we go on cutting off from the Deity first this and then that human affection, we shall not at last come down to an abstract reality, but we shall leave the Deity minus His perfections, plus something else, viz. the residuum of human affections, without getting one single atom nearer the truth by those unhallowed proceedings. The common mode of reasoning pursued in philosophy is that certain human affections, because they are not perfect and are limited, cannot be predicated of the Creator, and we must therefore take them away, leaving only the residuum. The question is, what is that residuum? Dr. Irons has begun his first attack on that theory with great propriety, and he attacks the whole of that unfortunate system of theology, as well as of philosophy, which ends, if fairly and logically carried out, in depriving the Creator of all conceivable attributes whatever, and reducing Him to a nullity, or involves the plain and unquestionable principles of Pantheism. I attach great importance to the attack on those principles, and am glad to see it carried to a considerable length in this paper. Then Dr. Irons well describes the principles of the Eleatics, saying they would argue—

"If the Supreme be Infinite, how can the Infinite have movement?"

Now a great many of the errors of the present day proceed from the introduction of ideas taken from mere dead physical nature and applying them to the moral nature of man. This is a great point, which should be strongly brought out, for it really is the foundation of all the attacks I know of upon Revelation. If that original assumption be strongly and plainly resisted, as it can be upon the soundest principles of reason, the whole of the philosophy and theology founded upon it falls to the ground. You see the Eleatic philosophy speaks here of movement—

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"If the Supreme be Infinite, how can the Infinite have movement?"

But there are two conceptions of movement, physical and moral. The movements of the physical universe differ *toto cœlo* from those of my mind. It is misleading and a misapplication of terms to apply the word "movement" to mental and, above all, to moral phenomena. It is bringing down the mind of man to the level of the pure physical creation; but it does not need argument to show that the movements of the mind of man differ *toto cœlo* from the movements of the physical creation. The third paragraph in the same page is exceedingly admirable. Dr. Irons says:—

"In these speculations it would almost seem that there is no escape from a denial of Him whom we have to recognize as Supreme moral Governor! The Supreme has no past, no future, no retrospect, no prospect, no thought, no deed!"

The result is inevitable, assuming the principles stated in the paper. If you once lay down that there is nothing but an eternal "am" of the Creator, these things follow as a matter of course, and you arrive at a false philosophy based upon false principles. But the real thing to be done is to get out of these false principles. It is evident that it is impossible to conceive of the Creator without assigning to Him a personality; and if we assign to Him a personality, that personality must be imaged by the human personality, and must involve the application to Him, freed from their imperfections, of our various human moral attributes. That does not involve any contradiction at all. In the latter part of the same paragraph Dr. Irons says:—

"The Eleatic philosophy assumes (what nothing but an exhaustive analysis of such ideas as 'being,' 'thought,' and 'volition' would justify) that the finite limitations of those ideas are essential to them."

Of course the whole of these conceptions have an essential existence quite apart from their finite character, and are capable of being applied to the Creator Himself. Again, Dr. Irons says:—

"A consciousness transcending the phenomenal is the great fact on which our whole investigation rests."

Now it is in this that I think the paper is so very valuable, because it persists in going back to the facts of our inward spiritual consciousness, of which we are more certain, perhaps, than of any other species of knowledge whatever. I feel that I have a firmer ground of knowing certain facts of my inner consciousness than I can have of any facts of external nature, and Dr. Irons is worthy of much commendation on this point for persisting in going back to these, in spite of all metaphysical theorizing. In the same paragraph of the same page he says:—

"If we are conscious at all, we are as conscious that the phenomena and ourselves are not the same, as we are of our own being."

That is a most important assertion: in fact, when I reflect upon it, it affords

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me a guarantee of unquestionable certainty that I know that the phenomena by which I am surrounded and myself are two different things, differing *toto cœlo;* and that I have a voluntary nature which is capable of being an originating cause of action, in which it stands related to the Supreme as being His distinct image. The Creator, unbounded by conditions, is the originating cause of action; and I am an originating cause of action, bounded by conditions. I cordially agree with Dr. Irons in the necessity for bringing these points to bear upon theology, and I am satisfied that if we get rid of the whole class of Eleatic thought from our moral philosophy, we shall be able to see our way to get rid of a vast number of differences which harass and trouble the Christian Church in the shape of theology. I have given much consideration to the subject, but I cannot enter upon it at any length to-night. I wish, however, to give my most cordial thanks to Dr. Irons for the way in which he has dealt with it, and I would strongly recommend to every one's attention those portions of the paper where he has pointed out distinctly how it is that a great deal of what is called modern theology is nothing more nor less than a mischievous dishing up of the old Eleatic philosophy, which is most injurious to the cause of Christianity.

Rev. Dr. Irons.—It might assist discussion if I were to suggest that if any gentleman has any questions to put to me I shall be most willing to undergo cross-examination. There are an immense class of questions dealt with in the paper, about which some gentlemen may desire to question me.

Mr. Reddie.—Allow me to take advantage of that suggestion by making a few remarks and asking a few questions with especial reference to that part of the paper which Mr. Row has already referred to. Dr. Irons speaks of the distinction between the conception of morality in the Supreme and in ourselves. He says:—

"In Him there is no beginning to be good; for the Supreme ever exists and is ever good. The opposite thought were a contradiction as well as a blasphemy."

Now I should be glad if Dr. Irons would work that out in some detail. I should like him to demonstrate, either in his reply or his next paper, how it is that an eternal evil is a contradiction in itself and not conceivable. If that were worked out, it would enable Dr. Irons, in summing up, to add to those two important deductions at which he arrives,—namely, that universal unconsciousness is an absurdity, and that universal nothingness is an absurdity,—the further deduction that universal or eternal evil (for the word "universal" is used in the sense of "eternal") is also an absurdity and inconceivable. In all these things we have to judge by our reason; and we may arrive at the conclusion rationally, that universal or original evil is impossible, just as we may argue that something could not come from nothing. And as regards the existence of consciousness, also; for instance: if you can conceive such a condition of the world as an utter absence of consciousness and of pre-existing conscious mind, then there could have been no such things as conscious beings. Now reasonable beings being

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the judges, they can only judge in accordance with the being which has been given to them ; and if we could conceive such a thing as human beings constituted with an original evil nature instead of with an original good nature, it is quite clear that they would not consider that which was in accordance with their own nature to be evil, but would come to the conclusion that it was good. But there cannot even be a rational conception of eternal evil. For you cannot understand the word evil except in the sense of its being a contradiction to something good, which therefore must have preceded it. Evil means that which is not good. It is possible, I think, to work that out in a logical manner in these papers, and to demonstrate with the most rigid accuracy and strictness that an eternal evil is an impossibility. I should be glad to see that part of the paper more fully made out, and to have the three deductions, instead of these two, at the end. It is perhaps scarcely fair, however, seeing that we have not yet heard Dr. Irons's third paper, to assume that he probably may not do this ; but it seems to belong more to this part of the subject than to that which has still to come. Dr. Irons has been hitherto destroying much false philosophy passing current (I am sorry to say) as orthodoxy, and I presume his next paper will be more constructive, and therefore perhaps more interesting to us all. We shall then have the positive truths stated, and especially the truth *par excellence*, as it comes to us in Christianity.

Rev. C. A. Row.—There is one other passage which I ought to have pointed out as well worth our attention. Dr. Irons says :—

"Now here is a new point of difference between the Supreme and the finite conscious agent. The Supreme cannot be more good ; the finite can. Our character is affected, as God's is not, by the fact of continuance, both of being and of action. However good a finite nature may be in its beginning, however truly responding to the always-true, it acquires power by continuing good. And continuing acts of good are ever-increasing developments of the power of the conscious finite agent. Continuing in goodness is advancing in goodness. It is better known the longer it is known."

I apprehend Dr. Irons has written this paper on the grounds of human reason, and what I wish to point out is, that although this passage is founded upon human reason, it throws light upon and confirms the assertion of the Evangelist,—"Jesus increased in wisdom and stature, and in favour with God and man."

The Chairman.—It would be very presumptuous in me to make any observations on this admirable paper. I can only say that I most heartily and thoroughly go with it ; but I feel that any discussion upon it would be almost out of place, as we have not yet got the final portion of the paper, which I think may throw the greatest possible light on all that has gone before. We shall perhaps discuss the subject more advantageously, therefore, when we have the whole of Dr. Irons's views set before us. I cannot help expressing my great gratification that this Society has had the privilege of putting before the world such an amount of profound thought on the most

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important subjects of the present day. Certainly the Victoria Institute is fulfilling the purposes of its founders in the fullest degree in bringing before the public such papers as these, which are full of profound thought, calculated to meet perfectly all the distressing Sadducean objections of the present age. If men could only think and deliberate in such a style as this, we should find that the extremely superficial metaphysical thought which has been manifesting itself hitherto, and producing such a Sadducean leaven on the literature of the country, would soon be obliterated; and I cannot help thinking that Dr. Irons is doing the same good in this generation, in such a paper as this, as Bishop Butler did in his generation. I only hope that hereafter Dr. Irons will respond to the suggestion of Mr. Row by giving his paper a more popular character, better suited for general appreciation. He has confined himself here to stating his thoughts in the closest possible manner; and I cannot help thinking that each sentence might well be elaborated into a page, with the greatest possible advantage to those whose habits of thought have not fitted them to follow this close style of reasoning. The paper before us manifests the results of a lifetime of study of the most difficult writers upon the most difficult subjects that perhaps the human intellect has ever exercised itself upon. We cannot therefore but feel indebted to Dr. Irons for putting before us the main principles of heathen philosophy, manifesting what were the thoughts of men when they were earnestly striving after a knowledge of God; and for putting that before us in a comprehensive shape, condensing into a short space that which in point of fact can only be found in the largest folios of our libraries. I can only again express my extreme gratification at having had the pleasure of presiding in the Victoria Institute when such elaborate papers have been brought before us. The paper is manifestly an answer to the superficial thought of the present day, which would bring before people the idea that everything which is purely philosophical or scientific must be opposed to the doctrines of revelation. I think Dr. Irons has shown us how the highest thoughts that the human intellect can reach, not only confirm all that has been taught us by God's own book—the book of revelation—but also that those thoughts can be elaborated according to the purest systems of science and of the most refined philosophy; and that we, as Christians, need not be afraid to meet the men of the world on their own ground, in order to show that pure and true science and sound philosophy never can be at variance with those truths which God has revealed to man. (Hear, hear.)

Dr. Irons.—I have to thank you, Mr. Chairman, for your appreciation of my paper, which I quite agree should have been five times as long as it is. With regard to the discussion which has taken place on the paper, Mr. Row has asked me to consider the circumstances of human probation, which arise out of the fact that we are so differently conditioned and circumstanced from our birth. I would point out to Mr. Row that in the present paper I have referred back to these very difficulties which I specified in my former paper. He will find this passage:—

"The relation once established between the Moral Agent and the Moral

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Governor abundantly suffices for the final solution of all the difficulties which we first confessed do lie in the idea of Responsibility."

Now, I put forward six different special difficulties, comprehending, as I thought, every point that could possibly be raised on principle against what I was about to teach, and to that part of my former paper I must refer Mr. Row. What he has said about the importance of language as affecting our responsibility is of course included in that reply, which will be found in my former paper. The Supreme Moral Governor, while adjudicating upon our probation, takes *all our circumstances* into consideration, whether they be of language, birth, colour, education,—whatever they be. Everything is provided for; and the more we reflect upon this, the more we feel that there is no necessity for a deeper examination, which must fail, because we cannot know all the circumstances of all our fellow-men; while God does know them, and He will be their ultimate Judge. It is far better to meet the difficulty by a broad and comprehensive solution of that kind. Mr. Reddie has asked me to prove a contradiction. I think I have said in my paper some half a dozen times, "this is a contradiction;" and I have meant by that, that the opposite conclusions to what I have advanced are inconceivable. Every demonstration carried to its furthest extent ultimately becomes an *argumentum ad absurdum*, and shows that the opposite conclusion is a contradiction. Every problem in Euclid is, in point of fact, an appeal to our sense that we cannot say the opposite to what is set before us without committing an absurdity. If you will fairly weigh the proposition which Mr. Reddie has selected for you, I think you will find that you cannot conceive the opposite. In my paper I have never said that anything is a contradiction, until I have fairly weighed it in my own mind and put the opposite thought before myself to see if it could be maintained at all. When I have found that that opposite thought could not be put into words,—that it was alike intangible and inconceivable,—I thought I was justified in saying that it involved a contradiction. Mr. Reddie seems to think that I should have done better if I had spoken in detail of the impossibility of evil being eternal; but the same thing may be said of that as of universal nothing, or of universal unconsciousness. If there had ever been eternal nothing, there never would have been this universe. If there had ever been no consciousness, thought never could have sprung up, nor any thinking being. It is inconceivable. So if there ever had been an eternal, universal evil, all that is good in our hearts and consciences and in our lives could never have existed. There could have been no good thing to stimulate affection, or to give complacency or joy to any human being. Every one who is conscious, who knows what good is, who can feel joy and love, must feel that the notion of eternal evil is a contradiction. It is upset by a single fact: one good thing in the whole universe is enough to give the lie to the theory of eternal evil: it would never have come into existence if evil had always been from eternity. Mr. Mitchell supposes that I may supply, in my third paper, any defects in the two papers I have already read. But I shall have my hands far too full to do that. The

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two papers which I have already written must stand on their own footing, I assure you; and I can do nothing but challenge those who may dispute the conclusions of my third paper to fall back on numbers one and two, and destroy them if they can; but I do not believe they can be destroyed, without entirely denying human responsibility and everything we think respectable and decent and loveable in human nature. "If there be any virtue, and if there be any praise," says that profound thinker St. Paul (and I would say the same), these principles, and these alone, must be true. With regard to paper number three, it will contain a brief discussion of the fundamental principles of Comte's philosophy, with the manner in which that philosophy is repudiated by all the deepest thinkers in America, Germany, and France. It seems to have had its round, and now it is rejected, even by persons not so very profound as Professor Huxley. That philosophy is now entirely discarded by all ripe thinkers, and I shall deal with it in about four pages at the beginning of my next paper; after which, I shall open the subject of our religion, by falling back on those principles which I shall shortly state, as I have already laid them down for my foundation. Now you are aware that a great deal of this paper, as Mr. Row has said, is directed, to speak plainly, against the semi-fatalism of the Anglo-Saxon mind. It has so deeply penetrated our nature that we might almost despair of rooting it out, but for the certainty that truth must prevail. And we begin now to see that Calvinism is coming to its end. I should not have been wise if I had done on this occasion what some of our friends seemed to wish—mentioned the names of all those whose opinions I am endeavouring to destroy. I should have detained you a much longer time, and I should have wounded some of your hearts most deeply. (Laughter.) As it is, you are called on to see a particular error exposed; but if I had said, "Why, that is the very error of your dear friend so-and-so," you would hardly have forgiven me, and I should have had no chance of taking you with me. (Laughter.) I did not mention the Dean of St. Paul's nor his opponent: Mr. Row has done that. But I believe those two gentlemen, when they were writing so desperately about the philosophy of the absolute, really meant the same thing, and did not know it. (Laughter.) I have endeavoured to avoid the mention of all names even in the history of our own English ethics, because we saw here the other night a gentleman who felt a deep interest in one particular philosopher, and I should have had very little toleration from him if I had named that philosopher without doing full justice to him. Now I have not tried to do justice to any philosopher at all: I have only tried to do justice to my subject to the best of my power, and to keep clear of everything that could prejudice it. Considering the great difficulty of the subject, and the kind way in which you have come, notwithstanding the great inclemency of the weather, to hear my paper, I can only thank you very much for your attention. I hope to have my third and last paper on the subject ready for reading in June.

The meeting was then adjourned.

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ORDINARY MEETING, March 15, 1869.

Charles Brooke, Esq., M.A., F.R.S., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Rev. Mr. Davison then read the following paper :—

ON THE NOACHIAN DELUGE. *By the Rev.* M. Davison, *Mem. Vict. Inst.*

IT was at the battle of Sadowa, if I remember rightly, and at the very moment when the victorious Prussians were everywhere driving back the foe, that, by an unaccountable mistake, an Austrian battalion turned their weapons against their companions in arms, and thus contributed not only to the confusion of a disastrous retreat, but also to the sickening sights of that terrible battle-field. If such a blunder as this seldom occurs when hostile armies meet, it is to be regretted that it is of such frequent occurrence when the champions who occupy the field are, on the one side, the representatives of Infidelity, and, on the other side, the representatives of Science and the representatives of the Bible. Continually are we compelled to witness the unseemly and humiliating spectacle of the hosts of Infidelity resting on their rusty arms, while the soldiers of Science and the soldiers of Scripture, who should form one invincible army, are assailing each other with those powerful weapons, which, if turned against the common foe, would secure a speedy and decisive victory. Nor can we help apportioning the blame of this blunder pretty equally. Scientific students are to blame, inasmuch as they ignore that Book which professes to give authoritative information upon many topics to the investigation of which they address themselves. And theologians are to blame, inasmuch as they look with suspicion upon natural science, and, as a class, reject its undoubted teachings, when these come into collision, not with the inspired declarations of the Bible, but with human interpretations of these inspired declarations. Now it cannot be too often reiterated, that God has revealed himself in Nature, as well as in the Bible, and that, therefore, the two revelations must be harmonious. The

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revelations cannot be antagonistic, for if so, we should have God in the Bible denying himself in nature. Antagonism, where it exists, must arise from insufficient knowledge, or from too hasty generalizations on the part of men, and by no means from contradictions in the revelations which God has given of himself. The revelation of God in Nature is certainly not at all so full as the revelation of God in the Bible. Nature tells us that there is a God, and she tells us not a little also, of his wisdom, power, and goodness; but toward the solution of such questions as the nature of Deity, the creation of the universe, the origin of evil, the possibility and the plan of pardon, Nature gives us no assistance. For satisfactory information upon such momentous questions as these, we must turn to that Book, one of the most striking evidences of the divine authority of which is, that it concerns itself almost entirely with the solution of enigmas, which humanity, in all ages, has attempted, but attempted in vain, to solve. Still, while Nature propounds many questions which she cannot answer, we are not on that account to ignore the information which she supplies regarding the works and ways of the Great Creator. Her revelations are not so extensive as those which the Bible contains; but they are quite as authoritative, and quite as sacred. Once let the facts and the principles of Natural Science be firmly established, and they are revelations from God, as sacred as those commands which with his own finger Jehovah wrote on Sinai, or as that royal manifesto which Immanuel proclaimed from the Mount of Beatitudes. Hence the frequency with which the Biblical writers appeal to the revelation of God in Nature, and make that revelation the basis of the majestic superstructure which they were inspired to rear. Does Isaiah wish to strengthen the faith of the Lord's people in Jehovah's power? He points them to the stars; bids them remember who created, and who upholds them; and thus enforces, with resistless power, the lesson, that the Everlasting God, the Lord, the Creator of the ends of the earth, fainteth not, neither is weary, that there is no searching of his understanding. Does our Lord wish to animate his followers with confidence in the special providence of God? He points them to the lilies, to the sparrows, and bids them trust in Him, without whose permission the lily fades not, and the sparrow falls not to the ground. And what we plead for now is, that Christ's followers should imitate prophets, apostles, and the Master himself, in recognizing God's revelation in Nature, and in using it in the interpretation of his higher revelation in the Bible; that they should thankfully accept of all the light which Geology can cast upon

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the Mosaic Cosmogony, or the narrative of the Deluge; and that thus, the Interpreters of Nature and the Interpreters of Scripture fighting no longer against each other, or standing coldly aloof; but shoulder to shoulder in the great battle for the truth, should unitedly carry their splendid spoils to His altar, who is at once the God of Nature and the God of the Bible—the Great Creator and the Great Redeemer. This spirit, becoming alike the philosopher and the Christian, we must endeavour to carry into the investigations which are now to occupy our attention.

So much has been written upon the Noachian Deluge, both before and since Geology took its place among the sciences, that it would be presumptuous to pretend to originality in this paper. My business is not so much to discover, as to examine carefully what laborious explorers have already discovered. I occupy the position, not so much of a barrister, who skilfully arranges his evidence so as to procure a verdict in his favour, as of a judge, who reviews and sifts the evidence which has been presented, in order that truth may triumph.

If such an occurrence took place as that Deluge which is reported in the Book of Genesis, we might reasonably expect that traditions of it, more or less correct, would be found floating through all ages and in all countries. A devastating Flood which destroyed the whole human race save those eight persons who were miraculously preserved in the ark, would be sure to leave an indelible impression upon the world's memory. Hence, if the history of the Deluge contained in the Bible had been unsupported by widely diffused traditions, there would have been some reason for the existence of doubts as to the occurrence of such a catastrophe. But just as we have in the Elysian Fields and in the Golden Age, which bathed their first inhabitants in blessedness, traditions of that Paradise, in which, in a state of holy innocence, God placed the progenitors of our race, so have we, on every hand, traditions of the Deluge, by which "the world of the ungodly" was swept of its inhabitants. So redundant are these traditions, that in the examination of them, one scarcely knows where to begin, or what outstanding illustrations to fix upon. The island of Atlantis, at the suggestion of Jupiter, immersed in the Ocean, in order that the depravity of its inhabitants might be washed away; the prominence given to an ark, or ship, in many of the heathen mysteries; the representations of undoubted facts in the Noachian history, on the coins of Greece and among the hieroglyphics of Egypt; the picture on the famous Apamæan medal, belonging to the time of the

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elder Philip, of a man and woman, in one compartment, sitting in a floating ark, with a bird carrying a branch above them, and in another compartment, leaving the ark, on which the letters NΩE* are inscribed; the curious Mexican painting, copied by Humboldt, in which the "man and woman who survived the age of water" are represented safe in an ark-like structure, while the goddess of water is deluging the world—these remarkable traditions can be explained from no other standpoint than that which assigns to the Noachian Deluge a place among the undoubted facts of history. Without going so far as Bryant, who in his *Ancient Mythology* contends that traditions of the Deluge form the basis of all Heathen worship, and that all the ideal gods of the Heathen world were representatives of Noah, and those who were saved with him in the ark,—without at all going so far as this, I am prepared to maintain, that in the mythology of the ancients, apart altogether from the testimony of the Divine Word, there is more than sufficient to prove, that in the remote past, some such catastrophe as the Noachian Deluge did undoubtedly take place.

MYTHOLOGICAL.

In the Egyptian mythology we read of Osiris being enticed into an ark by Typhon, apparently a personification of the Ocean; of the ark being sealed, and thrown into the sea, till, after sundry tossings, it is cast on the coast of Byblus; while among the hyroglyphics, we meet with the Deity coming forth from the flood, as a child upon a water-lily. It cannot be denied that the traditions about Osiris are mixed up to a great extent, as was indeed natural, with overflowings of the Nile, but there is enough in the outstanding incidents to justify Professor Hitchcock's remark, that Osiris is "the Noah of Egypt."

The Assyrian tradition, which Berosus copied from the records of the Temple of Belus at Babylon, points most dis-

* I am not forgetful that attempts have been made to demonstrate that these letters have no reference to the name of Noah; but as Bryant in his *Vindication of the Apamœan Medal* has well replied—"The history still would remain in legible characters, independent of the inscription. Thus, take away the letters NΩE, or assign them to a different purpose than the name of Noah, yet the historical part of the coin can neither be obliterated nor changed. The ark upon the waters, and the persons in the ark, will still remain; the dove, too, and the olive will be seen; and the great event to which they allude will be too manifest to be mistaken."

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tinctly to the Deluge of Scripture. In visions of the night, we are told, the god Chronus appeared to Xisuthrus, then monarch of Babylon, warned him that a flood was imminent which would destroy the race, and commanded him to write a history of the past, and bury the document in the city of the Sun at Sippara. This done, the monarch built a huge vessel, put his family, property, and sundry animals on board, and waited for the threatened flood. It came that very day, but when the work of destruction was effected, the waters began to decrease. Xisuthrus then sent out birds, which finding no resting-place, returned. After a while he sent out others, which came back with mud upon their feet. Encouraged by this evidence of the abating waters, he despatched them a third time. They returned not. Then he quitted his vessel, and concerned himself with building cities and re-peopling the earth. With a change of names this remarkable record might be accepted as, on the whole, an accurate epitome of the Mosaic history of the Deluge.

The Hindoo mythology introduces us to a demon named Hayagriva, who stole the Vedas from Brahma. In consequence of this abstraction of the sacred Books, the whole race, with the exception of a prince and a few followers, became utterly corrupt. One day, while the good prince was bathing, Vishnu appeared to him in the form of a fish, which, increasing in size as it was removed to various waters, was at length placed in the Ocean. Then the fish-god spoke. He warned the prince that in seven days a deluge would sweep the depraved race from the face of the earth, assured him that a vessel would be provided in which he would find protection during the catastrophe, and commanded him to put his family, sundry animals, and a sufficient store of food on board. This done, the threatened deluge came; but amidst the surging waters the god-provided vessel was safe, being moored by the great sea-serpent to Vishnu's horn.

The story contained in the Persian Zendavesta, divested of its Oriental drapery, may be briefly stated thus:—Ahriman, the Evil One, having corrupted the world, the divine man-bull was commissioned to destroy it, which he did by bringing upon it a universal flood. In this deluge the entire race perished.

The Chinese also give us characteristically grandiloquent accounts of a deluge which overspread the whole earth, "and separated the higher from the lower age of mankind."

The Scandinavian tradition assumes, as might be expected, a horrible form. Their entire mythology is monstrous. Nor is this to be wondered at, when we remember the gloomy

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mountains, the deep, dark fiords, and the long dreary winters, with which the old Scandinavians were familiar. Their Paganism was sure to be of a sombre and even monstrous aspect. Hence their strange version of the Deluge. It was caused by the slaying of the giant Ymir, whose blood deluged the whole world and drowned its inhabitants, with the exception of a giant who happened at the time to be on board ship!

According to the Druids, the story of the Deluge runs thus —In consequence of the universal wickedness of mankind, the Great God, by means of a violent wind, sent a virulent poison upon the earth. Death was inhaled with every breath. A holy patriarch, however, and his company, were shut up within strong doors, through which the poison penetrated not. The poisonous wind was succeeded by a tempest of fire, which rent the earth asunder. Then the sea was flung upon Britain, the rain descended in torrents, and the whole country was submerged. The flood which thus washed away the impurities of the land bore up the vessel in which the patriarch and his friends were preserved, till the waters had been drained off, and they commenced the cultivation of a renovated earth.

In the New World we meet with similar traditions of the Deluge. A story comes down to us from the Aborigines of Cuba to the effect, that "an old man, knowing the Deluge was to come, built a great ship and went into it with his family and abundance of animals, and that wearying during the continuance of the flood, he sent out a crow, which at first did not return, staying to feed on the dead bodies, but afterwards returned, bearing with it a green branch." In Peru the Indians had a tradition that, long before the time of the Incas, the entire race, with the exception of six, who were saved on a float, were destroyed. Indeed, so universal did Humboldt find these traditions to be among the native tribes of America, and so remarkable in their resemblance to the Mosaic narrative of the Flood, that he at one time regarded them merely as fragments of the teaching of early missionaries; but on mature consideration he abandoned this hypothesis. "He even set himself," says Miller, in his *Testimony of the Rocks*, "when collecting the traditions of the Indians of the Orinoco, to examine whether the district was not a fossiliferous one, and whether beds of sea-shells or deposits charged with the petrified remains of corals, or of fishes, might not have originated among the Aborigines some mere myth of a great inundation sufficient to account for the appearances in the rocks. But he found that the region was mainly a primary one, in which he could detect only a single

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patch of sedimentary rock, existing in an unfossiliferous sandstone. And so, though little prejudiced in favour of the Mosaic record, he could not avoid arriving at the conclusion that the legend of the Maypures and Tamanacs, regarding a great destructive deluge, was simply one of the many forms of that oldest of traditions, which appears to be well-nigh co-existive with the human family, and which, in all its varied editions, seems to point at one and the same signal event."

But undoubtedly the most remarkable of all the traditions of the Deluge which have come down to our day, is that with which the Greeks familiarize us in connection with Deucalion. Claimed as king, both by the people of Thessaly and by the Syrians, it is extremely difficult to say anything more definite about Deucalion, than that he occupies a prominent place in Grecian mythology. Nor, indeed, for our present purpose, is it at all necessary to occupy ourselves with unravelling his mythical history. In Deucalion's time—so the tradition runs—the human race had degenerated into universal corruption and violence. Everywhere wickedness reigned, till heaven's just judgment was executed. Deluging rains descended till the sea rose over the dry land, and the whole earth was covered by the flood. Every living thing was drowned except those which Deucalion preserved. Having provided himself with an immense ark, he caused his family and his sons' wives to take refuge in it, as also pairs of various animals, which during the flood lived together in perfect amity. The ark ultimately rested on Mount Parnassus. We all remember the sequel—how Deucalion and his wife, Pyrrha, consulting the oracle at Themis, were commanded to re-people the earth by throwing over their shoulders the bones of their great mother—how Deucalion interpreted this to mean the stones, which might be regarded as the bones of grandmother earth—and how the stones which were flung by Deucalion became men; while those which Pyrrha flung became women.

This rapid, and therefore imperfect, review of the testimony of world-wide Paganism to the occurrence of such a Deluge as is recorded in Genesis, is both interesting and important. It is interesting as showing the deep, the indelible impression, which this terrible judgment made upon the world's memory, and as showing also the necessity of a written revelation, if the grand and solemn transactions of Jehovah with men are to be handed down to future generations in the sublime garb of truth. It is also important as a striking confirmation of the truthfulness of the Mosaic narrative of the Deluge. However distorted the story may appear as read through the curious lenses which mythology supplies; whatever varieties may be

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presented in the names, the occupations, the numbers of those who are represented as having been saved; however intermingled the details may be with local deities, and local deluges, and local imagery; the outstanding facts, stripped of their fanciful drapery, can be satisfactorily explained only from the standpoint of the truthfulness of the Old Testament record. That deity, prince, or patriarch saved when the whole wicked world besides was destroyed; that Flood by which the corrupt race was swept away; that boat, ship, or ark, in which those found a refuge who were saved; that bird, sent forth when the waters began to abate; that leaf or branch which it brought to the ark; these remarkable facts, which we find scattered with more or less distinctness throughout mythologies belonging to all nations and to almost all stages of civilization, admit of no explanation but that which regards them as distorted traditions of that catastrophe which might well imprint itself indelibly on the memory of the human race—the Noachian Deluge.

GEOLOGICAL.

Mythology, as we have just seen, supplies us with many interesting confirmations of the truth of the Mosaic narrative regarding the Deluge. Does Geology add to these confirmations, or the contrary? Seventy years ago this question would have been answered most confidently in the affirmative, even by those who marched in the van of Geological science. Were there not rocks in all countries, containing the remains of animals and plants? Were there not superficial deposits of sand, clay, and gravel, manifestly the result of such a Flood as that which is identified with the history of Noah? Were there not scattered over the face of the whole world immense boulders, removed by hundreds of miles from their parent rocks, which only a tremendous rush of water could have carried to the positions which they now occupy? Were there not caves strewed with bones of animals, which had been carried on the face of the Deluge, till they were finally deposited in these rocky sepulchres? Were there not shells, manifestly of various marine species, found in localities hundreds of miles from the sea; nay, were they not frequently found far up the sides, and even sometimes on the summits, of lofty mountains? With such extraordinary phenomena as these before them, our fathers were confident that a universal deluge could be denied only by those who were incapable of estimating cumulative evidence, perplexing from its very abundance. Nor is it to be forgotten, that among those who referred such pheno-

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mena as the above to the action of the Deluge, the names of Buckland and Sedgwick might once have been numbered.

Like Augustine with his *Confessions*, however, they ultimately published their recantations. Here is Dr. Buckland's (*Bridgewater Treatise*, vol. i. page 94) :—

"Discoveries which have been made since the publication of this work ('Reliquiæ Diluvianæ') show that many of the animals therein described existed during more than one geological period preceding the catastrophe by which they were extirpated. Hence it seems more probable, that the event in question was the last of the many geological revolutions that had been produced by violent irruptions of water rather than the comparatively tranquil inundation described in the inspired narrative. * * * The large preponderance of extinct species among the animals we find in caves, and in superficial deposits of diluvium, and the non-discovery of human bones along with them, afford other strong reasons for referring these species to a period anterior to the creation of man."

And here is Sedgwick's (*Geo. Soc. Proceed.*, vol. i. p. 313) :—

"Bearing upon this difficult question, there is, I think, one great negative conclusion now incontestably established—that the vast masses of diluvial gravel scattered almost over the surface of the earth do not belong to one violent and transitory period. It was indeed a most unwarranted conclusion, when we assumed the contemporaneity of all the superficial gravel on the earth. We saw the clearest traces of diluvial action, and we had in our sacred histories the record of a general deluge. On this double testimony it was, that we gave a unity to a vast succession of phenomena, not one of which we perfectly comprehended, and under the name diluvium classed them altogether. * * * Having been myself a believer, and to the best of my power a propagator, of what I now regard as a philosophic heresy, and having more than once been quoted for opinions which I do not now maintain, I think it right, as one of my last acts, before I quit this chair, thus publicly to read my recantation."

It was impossible to study the rocks attentively without arriving at the conclusion that whatever might be the explanation of their origin and phenomena, it was certainly not the Deluge. The rocks could not have been deposited by the Deluge, as a few stoutly maintained, for they are found to consist of an endless series of strata, indicating different epochs, different climates, different predominant races. The superficial deposits could not have been deposited by the Deluge, for they are manifestly of different ages have been produced by different causes, such as rivers, lakes and the action of the sea; and contain organic remains perfecly distinct from each

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other. The erratic boulders found in every quarter of the globe could not have been deposited by the Deluge, for the sites which they occupy indicate that they were deposited at periods between which many ages intervened. The bone-caves could not have been furnished by the Deluge, for the alternating layers of stalagmite and remains of animals, which evidently lived, and died, and preyed upon each other for successive generations, can be explained by no sudden catastrophe like the Flood. Hence the phenomena which, less than a hundred years ago, were supposed to furnish incontestable evidence of the occurrence and the universality of the Noachian Deluge, are found to belong to a period long anterior.

Disappointing though this discovery must have been to the sanguine spirits who saw in every fossil and in every pebble evidences of a universal deluge, Geology did not send them away empty from her prolific fields. She gave them unmistakeably to understand, that she could furnish them with no proofs of the occurrence of that Deluge which is recorded in Genesis; and warned them that the facts on which they had been accustomed to rely would not sustain the evidential superstructure they were attempting to rear upon them. But while her testimony upon this point was unfaltering and decisive, she reminded them, that they had only to study her stony records in order to find endless illustrations of such catastrophes as that to which the Mosaic narrative points us. Geology could supply no proofs of the Noachian Deluge (at least so far as the general field of investigation was concerned), but she could supply a thousand proofs of occurrences of a similar kind. She could not supply the very bones of the wicked contemporaries of Noah, but she could point to the bones of many races which had successively disappeared from the globe. She could not demonstrate how the great deep overflowed the land, when "the world of the ungodly" perished, but she could point to many evidences of the sea and the dry land changing places; of mountains, like the Alps, once standing like solitary islands in the Ocean; and of majestic rivers and lakes once existing, where all that now remains of them are their buried beds. The testimony of geology, therefore, in relation to the Deluge, is most important, as establishing not only the possibility, but the probability, of such an occurrence. A catastrophe which would deluge a continent, and destroy its existing races, instead of being incredible, is, from a geological stand-point, neither strange nor unparallelled.

Some have maintained that we ought not to expect evidences of the occurrence of the Flood among the superficial

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deposits, since, allowing its universality, its action would not be of a violent kind. But this we cannot allow. It is impossible to conceive of such a catastrophe otherwise than as accompanied with most violent aqueous action. Conceive what a world-wide deluge implies—a depth of about five miles of water above the ordinary sea-level. Consider the causes by which it was produced—deluging rains without intermission, for six weeks, and the irruption of the sea upon the land. Then say if it is credible, that the action of such a deluge so produced should be so tranquil, as to leave no marks of its devastations? It seems to us that there is no satisfactory answer to those who point us to the absence of any such deposit as we might reasonably expect a universal deluge to leave behind it; and to the undisturbed superficial beds, over which a universal deluge must have passed; except the reply, that the Noachian Deluge being local, evidences of its occurrence can be demanded only in those regions which formed the cradle of the race, and over which the Deluge swept.

The scoriæ and ashes of which volcanic craters are for the most part composed, are well known to be of the lightest and least coherent kind. Exposed to the action of a flood, or the waves of the sea, a whole mountain of them would speedily be washed away. A case in point is afforded by the remarkable history of Graham's Island, a submarine volcano, which emerged from the sea in 1831. In a single month it rose to an altitude of 200 feet, and formed an island three miles in circumference. Yet within three months, the sea had entirely washed it away. Now in Auvergne, as everybody knows, there are extinct volcanoes which have not been active at least since the Adamic period. Their cones are composed of those light materials already referred to. Yet there they remain as they were before man appeared upon the world's stage. A universal deluge must have denuded them at least to their latest lava deposits, and therefore the presumption is strong, that no flood has submerged central France since these volcanoes were in a state of activity; in other words, since the Adamic race appeared upon the globe.

But while the testimony of Geology seems to me decisive against a universal deluge, it supplies interesting illustrations of the existence of forces, adequate, if the Most High so willed it, to produce this very day such a deluge as destroyed the godless race in the days of Noah. Alterations of level, both on land and in the bottom of the sea, are known to be every-day phenomena. Scandinavia is slowly but steadily rising from the sea; while the bed of the Baltic is becoming

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proportionably shallower. In 1556, an entire province of the mountainous part of China sank in a moment, the whole of the inhabitants being destroyed, and an extensive lake occupying the position of the once prosperous province. In 1664, during some of those fearful earthquakes with which the Chilian coast is so frequently visited, several considerable mountains belonging to the chain of the Andes entirely disappeared. In Java, the volcano Papandayang also disappeared in 1772. Passing over such remarkable phenomena as are presented by the ruins of the temple of Jupiter near Naples, and the appearance and subsequent disappearance of new islands, what can be more impressive than the accounts which have recently reached our shores of the subterranean convulsions which wrought such devastation along the entire western coast of South America, and asserted their presence even in the distant New Zealand? We have no need to go back to mythic times for marvellous stories of the earth sinking, and the sea rushing upon the land. The present generation has witnessed phenomena more than enough to convince the veriest sceptic, that there are even now at work forces which require only the fiat of Omnipotence to reproduce the cataclysm which befell the antediluvians.

Assuming that the Deluge was caused by the sinking of that part of the world which the antediluvians inhabited, and, along with floods of rain for six weeks, the consequent irruption of the sea upon the land, Dr. Pye Smith, and after him Mr. Hugh Miller, have attempted to define the area which might have been submerged. Let us state the hypothesis in Miller's own words :—

"There is a remarkable portion of the globe, chiefly in the Asiatic continent, though it extends into Europe, and which is nearly equal to all Europe in area, whose rivers (some of them, such as the Volga, the Oural, the Sihon, the Kour, and the Amoo, of great size) do not fall into the ocean, or into any of the many seas which communicate with it. They are, on the contrary, all *turned inwards*, if I may so express myself, losing themselves in the eastern parts of the tract, in the lakes of a rainless district, in which they supply but the waste of evaporation ; and falling in the western parts into seas, such as the Caspian and the Aral. In this region there are extensive districts still under the level of the ocean. The shore line of the Caspian, for example, is rather more than eighty-three feet beneath that of the Black Sea, and some of the great flat steppes which spread out around it, such as what is known as the Steppe of Astracan, have a mean level of about thirty feet beneath that of the Baltic. Were there a trench-like strip of country that communicated between the Caspian and the Gulf of Finland, to be depressed beneath the level of the latter sea, it would *so open up the fountains of the*

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great deep, as to lay under water an extensive and populous region, containing the cities of Astracan and Astrabad, and many other towns and villages. . . . . With the known facts, then, regarding this depressed Asiatic region before us, let us see whether we cannot originate a theory of the Deluge, free from at least the palpable monstrosities of the older ones. Let us suppose that the human family, still amounting to several millions, though greatly reduced by exterminating wars and exhausting vices, were congregated in that tract of country which, extending eastwards from the modern Ararat to far beyond the Sea of Aral, includes the original Caucasian centre of the race; let us suppose that the hour of judgment having at length arrived, the land began gradually to sink, as the tract in the Run of Cutch sunk, in the year 1819, or as the tract in the southern part of North America, known as the "sunk country," sank in the year 1821; farther, let us suppose that the depression took place slowly and equally, for forty days together, at the rate of about 400 feet per day—a rate not twice greater than that at which the tide rises in the Straits of Magellan, and which would have rendered itself apparent as but a persistent inward flowing of the sea; let us yet farther suppose, that from mayhap some volcanic outburst, coincident with the depression and an effect of the same deep-seated cause, the atmosphere was so affected that heavy drenching rains continued to descend during the whole time, and that though they could contribute but little to the actual volume of the flood—at most only some five or six inches per day—they at least *seemed* to constitute one of its main causes, and added greatly to its terrors, by swelling the rivers and rushing downwards in torrents from the hills. The depression, which by extending to the Euxine Sea and the Persian Gulf on the one hand, and the Gulf of Finland on the other, would open up by three separate channels the fountains of the great deep, and which included, let us suppose, an area of about 2,000 miles each way, would at the end of the fortieth day be sunk in its centre to the depth of 16,000 feet, a depth sufficiently profound to bury the loftiest mountains of the district. . . . And when after 150 days had come and gone, the depressed hollow would have begun slowly to rise, and when after the fifth month had passed, the ark would have grounded on the summit of Mount Ararat—all that could have been seen from the upper window of the vessel, would be simply a boundless sea, roughened by tides now flowing outwards with a reversed course towards the distant ocean, by the three great outlets, which during the period of depression had given access to the waters. Noah would of course see, that 'the fountains of the deep were stopped,' and 'the waters returning from off the earth continually,' but whether the Deluge had been partial or universal, he could neither see nor know."—(*Testimony of the Rocks*, p. 344.)

Such is Miller's ingenious theory to show the possibility of a deluge which would overspread that portion of the globe which the antediluvians inhabited, and at the same time meet all the requirements of that Deluge, the account of which

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Moses has preserved. Without accepting the theory in its entirety, we yet cannot deny that it is perfectly within the region of the possible—nay, that such subsidences and elevations of the land and such irruptions of the sea as his hypothesis assumes, are among the ordinary phenomena which Geology unfolds. If Geology, therefore, both by negative and positive evidence, protests against a *universal* deluge, this is certain, that she supplies facts in lavish abundance, showing the possibility of such a deluge as we believe the sacred historian to describe, a deluge which overflowed the whole of the then inhabited world; which submerged its loftiest mountains; and which destroyed the whole of the human race, with the exception of those who found an asylum in the Ark.

GENERAL CONSIDERATIONS.

I have now to consider the difficulties which present themselves in the path of those who contend for a world-wide deluge, and which to my mind are insuperable. It is true that these difficulties have not unfrequently been insisted upon by those who were enemies to the Bible, and whose ulterior design was manifestly, by magnifying such difficulties, to invalidate the authority of the Old Testament. Bishop Colenso is one of these. In his book on the Pentateuch, he labours, first of all, to fix down the Mosaic narrative to a universal deluge, and then, by a skilful arrangement of the insurmountable difficulties, geological and general, to such universality, endeavours to shut up his readers to the conclusion that the Biblical account of the Flood is incorrect. That foes to the credibility and inspiration of the Bible, however, have adduced these difficulties with a hostile intention, is no reason why we should shut our eyes to them, and, ostrich-like, imagine that our safety lies in refusing to face the disagreeable and the dangerous. Nothing has done greater damage to that religion which it is our privilege and honour to uphold, than such unwillingness to look fairly and fully at the objections which our opponents start. What have we to be afraid of? Have we so little confidence in the foundation of our faith, that we dare not dig down to it and examine its solidity? Can we maintain the authenticity, credibility, and inspiration of Holy Scripture only by ignoring everything that has been alleged against them? Certainly not. We have everything to hope, and nothing to fear, from a searching examination of the sacred records. We are ready to listen attentively to those who have objections to state, and who are ready to propound

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solutions of those objections which commend themselves to reason as well as faith. Let it not be said that we fear a thorough-going investigation. We invite it, confident as we are that the more searching it is, the more will it confirm the declaration that "the Word of the Lord endureth for ever."

The difficulties in the way of a universal Flood, therefore, which we have now to consider, must not be underrated because they have not unfrequently been stated by infidels. It is for us to determine—putting all *à priori* considerations aside—if they rest upon a basis of truth. And supposing this to be determined in the affirmative, it will be for us manfully to address ourselves to the discovery of the reconciliation which must always exist between what is true in nature and the immutable truths of the Divine Word.

The first difficulty which we encounter, supposing the Deluge to have been universal, is in the accommodation which the Ark afforded. To our older writers this presented no obstacle. Referring to the number of species, one of them says:—"Bishop Wilkins has brought their number, which at first view may seem almost infinite, within very moderate bounds. He reckons that they do not amount to one hundred of quadrupeds and two hundred of birds, and of these must be excepted such as live in the water, such as proceed from a mixture of different species, and such as change their colour, size, and shape by changing their climate, and thence in different countries seem to be of different species when they are not." So Dr. Hales. "Can we doubt," he says, referring to the Ark, "of its being sufficient to contain eight persons, and about two hundred or two hundred and fifty pair of four-footed animals; a number to which, according to Buffon, all the various distinct species may be reduced, together with all the subsistence necessary for a twelvemonth?" Since the days of Buffon and Hales, however, and earlier writers, whose remarks, prose and poetical, on this question, if we had room to transcribe them, would be most amusing, science, in every department, has progressed with gigantic strides, and in no department more rapidly than that of zoology. Sir Walter Raleigh put down the mammals at 89, and Buffon at 200 or 250 species. But our latest authorities give the known species of mammalia at 1,658, and the result of scientific inquiry is not to decrease, but to increase, the number. Johnstone, in his *Physical Atlas*, gives the following estimate:—

Mammalia . .	1,658	Reptiles . .	642
Birds . . .	6,266	Insects, about .	500,000

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These numbers of species must of course be regarded merely as an approximation to the correct number, but an approximation not in the sense of excess but in the sense of defect. Every continent, every island that is explored, is found to contain its own species, so that, as zoological investigation advances, we must expect the list of species to be largely increased. Now, if the Deluge was universal, the whole of these must have found accommodation in the Ark. Nay, more than these, for of those which, according to the Jewish law, were reckoned "clean," Noah was commanded to take by sevens, and of those which were reckoned "unclean" by twos, so that at the least a million of living creatures must have had their habitat in the Ark for a year. Nor do the difficulties regarding accommodation end here. Nothing can be plainer from the Mosaic history than this, that none of these creatures were fed miraculously. "Take thou unto thee of all food that is eaten, and thou shalt gather it to thee, and *it shall be for food for thee and for them*" (Gen. vi. 21). Who will estimate the number of animals required for the support of the carnivora, and the quantity of forage required for the support of the herbivora during the twelve months of the Flood? Indeed, as a writer on this subject, Dr. King, has well remarked, the food of many animals was of such a kind as scarcely to admit of being stored up. Ant-eaters, for example, would not easily be supplied with ant-hills.

Now, will any one be bold enough to maintain that that Ark, the dimensions of which are given in the Book of Genesis, was capable of containing a tithe of those animals, which, if the Deluge was universal, must have found protection within it? Assign to it the utmost capacity that fancy has ever yet claimed for it, and it will be found impossible to accommodate even a small proportion of the animals, which, on the assumption of a world-wide flood, would need to be preserved, to say nothing of the thousands of others, which would be required if the carnivora were to be fed, and the incalculable stores of forage which would be devoured every day, during twelve months, if life were to be barely kept in the herbivora.

Another difficulty must be met by those who maintain the universality of the Deluge. It is in the transit to and from the Ark, of the animals whose habitats were separated from each other by oceans, by mountain-chains, by half the circumference of the globe. So long as science was in its infantile state, considerations like these presented no insurmountable obstacles. Regarding the animals characteristic of various

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countries, merely as varieties of a restricted number of species, caused by climate, food, &c., our fathers were not troubled by such difficulties as we are now compelled to face. Given an Ark, which would accommodate a few of the more familiar types of wild animals, and a fair representation of domestic animals, what more was needed? Would not the lions, the tigers, the elephants, which left the Ark, speedily multiply, make their way to the countries in which they are now found, and, through various local influences, become characterized by those diversities which, in our day, so extensively prevail? So with the varieties among domestic animals. Our forefathers were conscious of no insuperable difficulties. Species were few, though varieties were many; and if they could find room in the Ark for the few species, they did not doubt that all existing varieties would soon spring from them.

But what do naturalists tell us now? That every region of the globe has its peculiar fauna and flora; that every continent and every island have plants and animals peculiar to themselves. Not only do the fauna and flora of polar regions differ widely from the fauna and flora of the tropics, but tracts of country, lying very much in the same latitude, are characterized by animals and plants peculiar to each. So that representatives of all existing species must have found a refuge in the Ark, assuming that the Deluge was universal. We have glanced at the insurmountable difficulties which surround us when we grapple with the question of their accommodation in the Ark, but no less formidable are the difficulties when we ask how they got to the Ark. If the theory of a universal deluge be correct, we must picture to ourselves groups of animals, wending their way from every quarter of the globe, to the place where the Ark was located. We must picture them, in their laborious efforts to cross mountains crowned with eternal snow, and to transport themselves across stormy oceans, which interposed thousands of miles between their homes and the spot toward which, for months and years, they toiled. We must picture the typical animals of the polar regions, and the typical animals of the tropics, encountering climates, which, in ordinary circumstances, would destroy both, and passing through countries which afforded food neither for the one nor the other. We must picture, in a word, beasts, birds, reptiles, from every quarter of the globe and every island of the sea, making their way to the Ark, from which they were separated by mountains, rivers, oceans, and continents, thousands of miles across.

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Nor is this all. The very same difficulties would meet them when they made their exit from the Ark.

"How," says Miller, "had the Flood been universal, could even such islands as Great Britain and Ireland have ever been replenished with many of their original inhabitants? Even supposing it possible that animals, such as the red deer and the native ox, *might* have swam across the Straits of Dover, or the Irish Channel, to graze anew over deposits in which the bones and horns of their remote ancestors had been entombed long ages before, the feat would have surely been far beyond the power of such feeble natives of the soil as the mole, the hedge-hog, the shrew, the dormouse, and the field-vole."

Equally pertinent are the remarks of Dr. Pye Smith:—

"All land animals, having their geographical regions, to which their constitutional natures are congenial—many of them being unable to live in any other situation—we cannot represent to ourselves the idea of their being brought into one small spot, from the polar regions, the torrid zone, and all the other climates of Asia, Africa, Europe, and America, Australia, and the thousands of islands—their preservation, and provision, and final disposal of them—without bringing up the idea of miracles more stupendous than any that are recorded in Scripture."

We read of no provision in the Ark for the preservation of the inhabitants of the waters, nor, a hundred years ago, was this considered at all necessary. It was assumed that, inasmuch as the denizens of the deep and of the rivers would still be in their native element, the commingling of fresh water and salt water over the whole globe would prove no inconvenience to them. Science speaks otherwise now, however. Very few species of fish, indeed, can exist in brackish water. With the exception of some, like the salmon, which at one time is an inhabitant of the sea, and at another time an inhabitant of the river, the greater part of our salt-water and fresh-water fish would certainly have been destroyed by the conditions which a universal flood assumes to have existed. Confirmatory of this is a fact mentioned by Mr. Miller, in his *Footprints of the Creator*, a felicitous title to a book which demolishes many of the fallacies in the *Vestiges of the Natural History of Creation*. He tells us that in the lake of Stennis, in the Orkney Islands, the fish and plants on the banks have each their locality, according as the water at its junction with the sea is salt, or farther in, brackish, or still farther, fresh. And though the more hardy members of each class are sometimes to be found out of their natural

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domain, there are few species which do not die when they venture beyond it. To the same effect is the testimony of General Reid, in his book on the *Law of Storms*. On the 10th of August, 1831, a fearful storm, he tells us, similar to some of those which recently ravaged St. Thomas, visited the island of Barbadoes. Such was the tremendous tempest, that the spray of the sea was carried inland for sixty miles, so that showers of salt water fell upon the land, and "the whole of the fresh-water fish in the ponds of Major Leacock died."

Nor would the vegetable kingdom fare any better than the bulk of the finny tribes in a universal deluge. Immersion for twelve months in water would be sufficient to destroy all vegetation and every seed save some of the hardier sort. From this point of view is not the olive-leaf which the dove brought in to Noah suggestive? Does it not point in the direction of a local deluge, which had not long covered the olive-tree, in the neighbourhood of which the Ark found a resting-place?

Another point, and our argument against the universality of the Deluge is closed. Whence was the water derived to encompass the globe to the mean depth of five miles above the level of the sea? Ignorant as we still are about the contents of the interior of the globe, there will be few, we presume, who will still hold with Burnet that there is a vast abyss of waters under the crust, which abyss was discharged upon the surface in the days of Noah, and absorbed into the bowels of the earth again after the catastrophe. Neither will Whiston's fanciful theory find many supporters, that the perihelion of a comet in close proximity to the earth so deranged the tides of the ocean on the surface, and the abyss in the interior of the globe, that a universal deluge was the appalling result. The general belief among those who cling to a universal deluge is, that water sufficient to accomplish the catastrophe was miraculously provided by God, and annihilated when the end for which it was created had been served. If we had any proof that such was the case, we should at once believe it. But the Mosaic narrative gives not the remotest hint of such a miraculous interposition. On the contrary, the historian distinctly specifies two causes which God was pleased to employ in execution of his judgment—the opening of the windows of heaven, an Orientalism for heavy and continuous rains; and the breaking up of the fountains of the great deep, an Orientalism for the eruption of the sea upon the land. And it is demonstrable that the utmost amount of water produced from these two sources would not inundate the globe to a depth exceeding a few inches.

It has been well remarked upon this subject that "argu-

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ment is at an end when supposititious miracle is introduced." If we are to concede the right of the upholders of a universal deluge to fall back upon miraculous interpositions whenever they are hard pressed, of which interpositions we have no evidence whatever—if we are to concede this, it is vain to suppose that science and the Bible can ever be harmonized, or the intelligence of the age brought over to the side of divine truth. By a supposititious miracle you can stow into the Ark representatives of every species of beast, bird, and reptile. By a supposititious miracle you can transport them from the poles, the tropics, the temperate zones, the countless islands of the sea, to the spot where the Ark was built. By a supposititious miracle you can float them across wide and tempestuous seas, and can reduce to plains, mountains like the Himalayahs, the Andes, and the Alps. By a supposititious miracle you can support them during the Flood with little, indeed, without any food, and can preserve fishes and plants, though conditions existed which in ordinary circumstances would have destroyed them. By a supposititious miracle, in a word, you can bring a universal deluge upon the world, and dissipate into nothingness, as with the fabled touch of a magician's wand, all the perplexing questions which might be pressed upon you. But I question whether you would thus render honour to the word and the power of God, or satisfy those thinking minds whose craving is after truth—truth which does violence neither to the revelation in Nature, nor to the revelation in the Bible—truth which recognises reason as well as faith. I have a strong conviction that this tendency among many religious people to fall back upon supposititious miracle, when objections to a universal deluge are advanced, is as unwise as it is unwarranted by the narrative in Genesis. Depend upon it, the age in which we live is not one to be satisfied with a solution of difficulties, which assumes miraculous interpositions whenever a Gordian knot presents itself.

I yield to no man in my reverence for Holy Scripture, all of which we believe to have been given "by inspiration of God." The absolute power of God over every domain of Nature we cannot doubt; and the miraculous forthputting of that power in the past we could deny only by recklessly setting sail on the tempestuous sea of an all but universal scepticism. We can conceive no limits to the power of Deity except those which indicate the boundary-line between right and wrong. But while subscribing thus heartily to a belief in the supernatural, and to the continual government of the world by God through those so-called laws of nature which are simply his

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ordinary modes of operation; while thankfully accepting St. Paul's declaration that God is never far from any one of us, and that in him "we live and move and have our being," I cannot sympathize with those who would resolve all the difficulties of a universal flood by calling in the miraculous power of Deity. Scripture says nothing of such miraculous interpositions. On the contrary, it tells us that by Divine direction Noah constructed the Ark; that Noah selected and brought into the Ark those animals which were to be preserved; that Noah stored up food for himself and for them; that by the breaking up of the fountains of the deep, and the opening of the windows of heaven, a deluge was produced which destroyed the then human race, with the exception of the Noachian family. That a Divine judgment was executed upon a depraved race by the Deluge, is made sufficiently plain by the sacred history; but the means which God employed in its execution belong not to the miraculous. The building of the Ark, the collection of the animals to be preserved, the storage of their food, the eruption of the sea upon the land, and the descent of unceasing floods of rain, cannot, in the proper sense of the term, be called miracles. Hence, taking our stand upon the Mosaic history of the Deluge itself, we are entitled to protest against the procedure of those who, encompassed with inextricable difficulties in their attempt to uphold a universal flood, meet our arguments by calling in supposititious miracles. The Bible says nothing of such miracles; and we, in our argumentative straits, may not conjure them up.

BIBLICAL.

We are now face to face with the important question "What saith the Scripture?" It must be candidly acknowledged that, if taken literally, its testimony regarding the extent of the Deluge is not at all dubious. The terms in which the catastrophe is described seem, at first sight, as if they had been purposely chosen to put the universality of the Flood beyond doubt. "The waters prevailed exceedingly upon the earth, and all the high hills that were under the whole heaven were covered"; "and all flesh died, that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man"; "Every living substance was destroyed, which was upon the face of the ground." No terms could be conceived less restricted than these. One cannot wonder, therefore, that before geological, and other considerations which go in the teeth of a

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universal deluge, had been brought prominently before the minds of the students of Scripture, the Biblical narrative of the Deluge was taken in its literal signification. It was believed, as Moses indeed seems to say, that the Flood overspread the whole globe; that the highest mountains upon the globe were submerged; and that every living creature, save those that were in the Ark, was destroyed. Still, it must not be forgotten, that long before geology had assumed the shape of a science, able and scholarly men, both among Churchmen and Nonconformists, had reached the conclusion that a universal flood was untenable. As early as the time of the Commonwealth, Bishop Stillingfleet wrote thus, in his *Origines Sacræ* :—

"I cannot see any urgent necessity from the Scripture to assert that the Flood did spread itself over all the surface of the earth. That all mankind, those in the Ark excepted, were destroyed by it, is most certain, according to the Scriptures. The Flood was universal as to mankind, but from thence follows no necessity at all of asserting the universality of it, as to the globe of the earth, unless it be sufficiently proved that the whole earth was peopled before the Flood, which I despair of ever seeing proved. And what reason can there be to extend the Flood beyond the occasion of it, which was the corruption of mankind? I grant, as far as the Flood extended, all the animals were destroyed, but I see no reason to extend the destruction of these beyond that compass and space of the earth where men inhabited, because the punishment upon the beasts was occasioned by, and could not but be concomitant with, the destruction of mankind. But (the occasion of the Deluge being the sin of man, who was punished in the beasts that were destroyed for his sake, as well as in himself) where the occasion was not, as where there were animals and no men, there seems no necessity of extending the Flood thither."

Pointing in the same direction, are the remarks of the distinguished Nonconformist, Matthew Poole, who was among the ejected in 1662, and whose *Synopsis Criticorum* is a monument of his great industry and learning :—

"It is not to be supposed," he says, "that the entire globe of the earth was covered with water. Where was the need of overwhelming those regions in which there were no human beings? It would be highly unreasonable to suppose that mankind had so increased before the Deluge, as to have penetrated to all the corners of the earth. It is indeed not probable, that they had extended themselves beyond the limits of Syria and Mesopotamia. Absurd it would be to affirm, that the effects of the punishment inflicted upon men alone, applied to places in which there were no men. If, then, we should entertain the belief that not so much as the hundredth part

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of the globe was overspread with water, still the Deluge would be universal, because the extirpation took effect upon all the part of the world which was inhabited. If we take this ground, the difficulties which some have raised about the Deluge fall away as inapplicable, and mere cavils, and irreligious persons have no reason left them for doubting of the truth of the Holy Scriptures."

Conclusions like these, reached by men like Stillingfleet and Poole, are peculiarly important, since it cannot be alleged that they were driven to them by what some would regard as the imperious demands of modern science. The learned prelate, and the equally learned Nonconformist whom I have quoted, were both ignorant of the state of opinion in this nineteenth century, under pressure of which we are supposed to be surrendering important outposts, essential to the successful defence of the Bible. Yet they reached the very conclusions regarding the extent of the Deluge, which we, in the light of modern science, feel ourselves shut up to. Still, the opinion of learned theologians two centuries ago will not settle this question, though they may impart confidence to us, when we are obliged to tread in their steps. Scripture itself must speak, and therefore to the Biblical narrative we return.

In all languages, the use of universal terms in a limited sense is not uncommon, but those who have studied carefully the *usus loquendi* of the Old Testament Hebrew and the New Testament Greek, must have been struck with the frequency of the phenomenon. Perhaps the hyperbolical phraseology characteristic of Orientals has something to do with it; but whatever the explanation may be, the fact is undoubted. Nor is there any safer principle by which to determine the true meaning of one of the sacred writers, than to compare his writings with those which proceeded from men similarly circumstanced, living in the same country, writing on the same grand themes, surrounded substantially with the same associations, and guided by the same inspiring Spirit. The *usus loquendi* of nineteenth century English would be a most incorrect standard by which to test the meaning of Hebrew lawgivers and prophets who lived centuries before Homer, or of men of Hebrew parentage, who wrote biographies and letters in Greek, about the time of Virgil. We must, as far as possible, denude ourselves of modern associations and modes of thought. We must endeavour to carry ourselves back to times when the earth was universally believed to be an extended plain, and when almost all that was known of it was the region extending from the Mediterranean to the plains of

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Assyria. From this, the only proper stand-point, "the whole earth" will convey a very different meaning from that which its employment by a modern writer would convey; while "under the whole heaven" will assume a correspondingly restricted signification.

Examples of unrestricted terms manifestly used in a restricted sense, are so frequent in the Bible, that one's only difficulty is to make selections. In the narrative of the Deluge we are told that "all the high hills that were *under the whole heaven* were covered." Well, observe in what sense "under the whole heaven" is used by the very writer to whom we owe the history of the Deluge. In Deuteronomy ii. 25, we have these words of Moses:—"This day will I begin to put the dread of thee, and the fear of thee upon the nations that are *under the whole heaven*, who shall hear report of thee, and shall tremble, and be in anguish because of thee." Compare this with chapter xi. 25: "There shall no man be able to stand before you, for the Lord your God shall lay the fear of you, and the dread of you upon *all the land that ye shall tread upon, as he hath said unto you*." These two verses compared, give us the meaning which Moses attached to the words "under the whole heaven." They are simply equivalent to "the land that ye shall tread upon"; in other words, to the land of Canaan and its contiguous tribes. The words of St. Luke, in Acts ii. 5, afford another illustration of the employment of almost the identical phraseology of Moses in a very restricted sense: "There were dwelling at Jerusalem," he writes, "Jews, devout men, *out of every nation under heaven*." Yet when he gives us details (verses 9—11), it is at once apparent that, like the earlier writers, he employs the words in a most limited sense. So St. Paul, when evidently referring to the chief countries in the Roman empire only, writes to the Colossians (i. 23) that the Gospel had been "preached to *every creature under heaven*." So far as the expression, "under the whole heaven," is concerned, then, it cannot be denied that, comparing Scripture with Scripture, we are perfectly justified in assigning to it, when necessary, a limited signification.

With respect to the declaration that "the flood was on *the earth*"; that "all flesh died that moved upon the earth"; that "every living substance was destroyed which was upon the face of the ground," a similar restricted meaning is allowed by the *usus loquendi* of Scripture. In Jeremiah li. 7, 25, 49, "*all the earth*" denotes the Chaldean empire. In Daniel ii. 39 it signifies the empire of Alexander the Great. In passages innumerable, which any Biblical Concordance will furnish, it

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means the land of Canaan. So that as little difficulty meets us in assigning to "all the earth" a limited meaning, as in assigning it to the expression "under the whole heaven."

Then in dealing with the universal terms whereby we are told that "all flesh died that moved upon the earth"—that "*all* in whose nostrils was the breath of life, of all that was in the dry land, died"; I cannot do better than quote from Professor Hitchcock's exhaustive review of this question :—

"In Genesis it is said that 'all countries came into Egypt to Joseph to buy corn, because the famine was sore in *all* lands.' This certainly could apply only to the well-known countries around Egypt, for transportation would have been impossible to the remotest parts of the habitable globe. In the account of the plagues that came upon Egypt, it is said, that 'the hail smote *every herb* of the field, and brake *every tree* of the field,' but a few days afterwards it is said of the locusts, that 'they did eat *every herb* of the land, and all the fruit of the trees, which the hail had left.' . . . . A like figurative mode of speech is employed in the description of Peter's vision, in which he saw a great sheet let down to the earth, 'wherein were *all manner* of four-footed beasts of the earth, and wild beasts, and creeping things, and fowls of the air.' Who will suppose, since it is wholly unnecessary for the object, which was to convince Peter that the Mosaic distinction into clean and unclean beasts was abolished, that he here had a vision of all the species of terrestrial vertebral animals on the globe? It would be easy to multiply similar passages. In many of them we should find that *all the earth* signifies the land of Palestine."

Scripture being its own interpreter, then, there is no difficulty in explaining the history of the Deluge in perfect harmony with a limited flood. And we are bold to say that we have really no choice in the matter. The arguments against the universality of the Deluge are so various, so cumulative, so weighty; they are drawn from such indubitable facts, supplied by so many sciences, that they can be ignored only by setting science in irreconcilable antagonism to Scripture. The necessity is urgent which requires us to acquiesce in a limited deluge; and it is plain from the *usus loquendi* of the Sacred Books, that the narrative of the Flood may be so explained. Why should we refuse to do this, when by doing it, we do no violence to Holy Scripture, and remove objections which cannot be regarded otherwise than as fair and well-grounded? Acknowledge that the Deluge was limited to that area which the antediluvians inhabited, and you cut away the ground from under scepticism; you satisfy the requirements of historic and scientific research; you re-assert the righteous judgment from which the catastrophe sprang; and

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you do no dishonour, but the contrary, to the declarations of the Word of God.

Of course the theory of a limited deluge assumes that the then population of the globe was by no means the ten or twelve thousand millions, at which Burnet and others have estimated it; that, on the contrary, through vice and violence, it was probably reduced to comparatively small proportions, and might be swept away by a flood extending over a restricted area. Certainly, so far as the testimony of Scripture goes, we have no reason to conclude that the antediluvian population was great. Men lived then to a great age, but there is no evidence that their families were in proportion to their years. Lamech, the fifth from Cain, had by his two wives only four children. Noah, five hundred years old before he had any child, had never more than the three sons who were saved with him in the Ark; while, in his six hundredth year, though his sons were married, they had no children. And although a few cases like these would afford a very inadequate induction of facts, on which to base conclusions regarding such an intricate problem as the population of the globe at the time of the Deluge, I cannot bring myself to entertain for a moment the extravagant estimates which some even in our own day have put forward. It is almost needless to say, that all reasonings based upon the increase of population in modern times, among the Anglo-Saxon and Anglo-American races, must be fallacious when applied to the antediluvians. The rate of increase in population among different nations is so diverse, and is affected by so many disturbing influences, that the conclusions of theorists upon the subject are perfectly valueless. It is well known that the prevalence of vice to a great extent will prevent any increase in population; while a chronic state of lawlessness and violence will depopulate, not cities only, but entire tribes. Now, these two causes were in full operation in the antediluvian world—a circumstance which has been strangely overlooked by those who have directed their attention to this question. "The earth," we are told, "was corrupt"; so universally and inveterately corrupt, that not till the entire depraved race was destroyed, could the corruption be eradicated. As a consequence, too, of the prevalent corruption, the historian narrates that the earth was "filled with violence." What would be the inevitable result of such corruption and violence? Would it not be a rapid decrease in the population, such as universal vice and anarchy would certainly produce in any nation at the present day? This is exceedingly well put by Hugh Miller:—

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"The terms in which the great wickedness of the antediluvians is described indicate a period of violence and outrage; the age which preceded the Flood was an age of 'giants,' and of 'mighty men,' and of 'men of renown'—forgotten Attilas, Alarics, and Zingis Khans, mayhap—'giants of mighty bone and bold emprize,' who became famous for their 'infinite manslaughter,' and the thousands whom they destroyed . . . . It has not unfrequently occurred to me—and in a question of this kind one suggestion may be quite as admissible as another—that the Deluge may have been more a visitation of mercy to the race than of judgment. Even in our own times, as happened in New Zealand during the present century, and in Tahiti about the close of the last, tribes restricted to one tract of country, when seized by the madness of conquest, have narrowly escaped extermination. We know that in some instances better have been destroyed by worse races—that the more refined have at times yielded to the more barbarous; yielded so entirely, that all that survived of vast populations and a comparatively high civilization have been broken temples, and great burial-mounds, locked up in the solitudes of deep forests; and further, that whole peoples, exhausted by their vices, have sunk into such a state of depression and decline that, unable any longer to supply the inevitable waste of nature, they have dropped into extinction. And such may have been the condition of the human race during that period of portentous evil and violence which preceded the Deluge. We know that the good came at length to be restricted to a single family; and even the evil, instead of being numbered, as now, by hundreds of millions, may have been comprised in a few thousands, or at most a few hundred thousands, that were becoming fewer every year, from the indulgence of fierce and evil passions in a time of outrage and violence. . . . At all events, the *proof* of an antediluvian population, at once enormously great and very largely spread, must rest with those who hold that its numbers and extent were such as to militate against the probability of a deluge merely partial, and any such proof we may, with the good old Bishop of Worcester, well 'despair of ever seeing' produced. Even admitting, however, for argument's sake, that the inhabitants of the Old World may have been as numerous as those of China are now—a number estimated by recent authorities at more than three hundred and fifty millions, and the admission is certainly greatly larger than there is argument enough on the other side to extort—a comparatively partial deluge would have been sufficient to secure their destruction. In short, it may be fairly concluded that, if there be a show of reason against the theory of a flood merely local, it has not yet been exhibited."

I do not know that there are any important points which I have overlooked in the consideration of this question. But for the pressure of clerical life in London, I might perhaps have been able to arrange the facts, and elaborate the arguments, in a way more satisfactory to myself. However, with all its defects, I am not without hope that this paper may assist some to arrive at a correct conclusion regarding a

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historical occurrence, which has given rise to no end of controversy, and *that* I believe, just because theologians have clung to a theory of the Deluge, against which incontrovertible facts protest, and in favour of which not even the *usus loquendi* of Scripture itself can be pleaded. It is vain to say that time will bring us additional light upon this subject. The lapse of years—of centuries, can never find accommodation in the Ark for representatives of all existing species of animals, with a sufficiency of appropriate food for twelve months. The lapse of years—of centuries, can never reduce the number of species; can never alter the conditions under which plants and fishes exist; and can never remove the difficulties attendant upon the supposition that animals from every region of the globe found their way to the Ark, and after the Flood found their way back, over mountains, across oceans, thousands of miles, to their respective homes. Necessity is urgent, therefore, that theologians should frankly accept that theory of a limited flood, which satisfies science, nay, which is supported by science, and which does no dishonour to the Word of God. Every intelligent student of the Bible is aware of the difficulties which crowd round the theory of a universal deluge, and surely it is not only legitimate but wise, to accept a solution which Scripture itself sanctions.

In the number of the *Sunday Magazine* for December, 1868, there is an article on Genesis, from the pen of one of the most able and cultured theologians in Scotland, Dr. Lindsay Alexander. It contains a paragraph which painfully illustrates the untenable position occupied by those who, intelligent enough to understand the difficulties, are yet too timorous to accept the only possible solution. He says:—

"It is vain to attempt to make the language of Moses square with the idea of a local deluge; and the impossibility of a universal deluge seems demonstrated by the clearest evidence of science. That there *was* a deluge, by which the race of man was nearly swept from the face of the earth, the traditions of all nations assert; but that it happened exactly as Moses describes, and that it spread over the whole earth, is a supposition involving so many difficulties, that only on the hypothesis of a series of miracles as great as that of creation can it be entertained. That God *could* have covered the surface of the globe with a sheet of water many thousands of feet in depth, without leaving any permanent traces of its action, and without disturbing the relations of the earth to the planetary system; and that He *could* have preserved in life and health a vast multitude of animals under conditions in themselves incompatible with these, it would be presumptuous to deny. But as the Bible nowhere says that God *did* perform these miracles, it seems no less presumptuous to assume their occurrence. No adequate solution of the difficulty has been proposed."

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Precisely what Bishop Colenso and his supporters are telling us —that Moses and science are irreconcilably opposed, and that there is no solution of the difficulty except the conclusion that the narrative of the Noachian Deluge in Genesis is untrue. This will never do. It is inexpressibly painful to see such able and excellent men as Dr. Alexander, acknowledging the impossibility of taking the language of Moses in his history of the Deluge literally, and yet declaring as emphatically, that it is impossible to make the language of Moses "square with the idea of a local deluge." What is this but doing the work of infidelity, and shutting up the intelligent mind to scepticism? It is the old story over again, that the Bible has suffered as much from the well-meant interpretations of friends, as from the most malignant attacks of foes. Thank God, that we can appeal from erroneous interpretations of Scripture to Scripture itself; and that we can adopt a theory of the Deluge, which while perfectly harmonious with science, is in strict accordance with the *usus loquendi* of the Bible.

The CHAIRMAN.—Before calling for any observations on this very excellent paper, there is a duty in which I am sure you will all cordially join with me, and that is in passing a vote of thanks to Mr. Davison for the admirable paper he has given us. (Cheers.) I shall now be glad to hear any observations which any one may have to make.

Mr. REDDIE.—I think it may be as well that I should rise thus early to notice some parts of the paper which has just been read, as to which, I think, what is already to be found in our printed proceedings, has been unwisely ignored by the author of the paper, and especially with reference to his supposed geological proofs. Mr. Davison relies somewhat confidently upon the extinct volcanoes of Auvergne, using, in that respect, Dr. Colenso's argument, which he considers correct. But in the sixth number of our *Journal of Transactions* there is a Note, quoting an article published in the *Quarterly Review* in 1844, in which it will be found that the argument against a universal deluge, and in favour of the immense antiquity of the mountain-cones in Auvergne, because of their evidently never having been covered by water, is completely refuted. Those mountains, it appears, were actually erupted in the fifth century of the Christian era; and we have, of course, had no universal deluge since then. It would occupy too much time now to make long quotations from that note, and as it is already upon record in our Journal, I simply content myself by thus calling attention to it. Dr. Thornton alluded to the argument based upon the supposed antiquity of these extinct volcanoes in one of his papers,* and showed the illogical and fallacious nature of that argument; but of this Mr. Davison takes no notice. Another of the supposed geological facts that Mr. Davison rests upon, is the slow and steady

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* *Journal of Transactions*, vol. ii. p. 155, and *Note*, p. 166.

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rising above the level of the sea of the Scandinavian coasts. Sir Charles Lyell was the chief witness to this supposed fact, that the coast of Sweden has risen so many inches per annum ; but in the *Geological Magazine* for the month of March last year, or thereabouts, will be found a perfect confutation of all that so-called scientific evidence. The Earl of Selkirk went over the same ground as Sir Charles Lyell, and made investigations at every place where Sir Charles had been where he supposed he had found proofs of the land having risen, as well as other parts of the coast, and the Earl found there were no such proofs of this imagined rise. All the evidence that could be gathered might just as well be used to prove the depression as the rise of land, all depending upon whether the tides happened to be high or low at the time. That fact is also on record in the scientific journal of the Geological Society of this metropolis ; so that, for these two very strong so-called facts, there is really no scientific foundation at all. With reference to the former, I must briefly point out how very much depends upon it. It is not merely that we have it proved from historical testimony which is unquestionable, that the mountains of Auvergne were erupted in the fifth century of the Christian era, and that their cones are not of great antiquity ; but we must recollect that the period assigned to the fossil man of St. Denise and the flint implements of the valley of the Somme, and many other supposed proofs of the antiquity of these districts of France, all vanish together, when it is proved that these mountain-cones are not of the enormous antiquity which had been assigned to them. Their age has no longer to be counted by millions or thousands of years, but only by a few hundreds. You will see, therefore, that Mr. Davison's geological proofs are by no means of that scientific character which he has assumed for them. Then, again, with reference to Professor Sedgwick's recantation of his former testimony to the universality of the Flood, I may remark that the very fact that Professor Sedgwick and Dr. Buckland did at one time hold that there were evidences of a universal flood must go for something, even if they adopted another theory afterwards. After that retractation, when they considered that the evidence in favour of the universality of the Flood was doubtful, and that the Flood might not be universal,—that is, when they took up with the nebular theory, and began to adopt the consequent theories of the vast antiquity of the various strata,—Dr. Cockburn, in 1844, at the meeting of the British Association in York, publicly challenged Professor Sedgwick and others who maintained those views, to defend them, as he was prepared, as a practical geologist, to account for all the facts of geology, in accordance with the ordinary mode of interpreting the Scriptures, including the six days' creation, and the universal flood. His challenge was not accepted, and Professor Sedgwick said he was not prepared to defend the nebular theory. In other parts of Mr. Davison's paper we are told that, in order to have a universal flood that would cover all the mountains, it must have been a flood that would have reached to five miles in height. But that is assuming that at the time of the Deluge there were mountains five miles high ; and I am not certain that there is any geological evidence of that, while I think that

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what evidence we have rather goes in the other direction. We certainly have it on good evidence that some most extraordinary contortions have taken place in the strata of the world. Such are those mentioned by Professor Ramsay, who says that tracts of strata, as large as half an English county, have been turned completely upside down. Sir William Logan also found evidence in Canada that upset many former theories, including that of the azoic ages. And his book shows, that there have been such marvellous contortions of the strata of the earth, that we cannot rationally conceive them to have taken place without creating great elevations as well as depressions of the earth's crust in many parts of the world; and this would most likely affect the height of its mountains. It is clear from the way in which the earth's crust has undulated, and has been rolled up and down, and waved about in various ways, that there must have been great depressions or elevations, and probably both. Then again we can only measure the height of a mountain by the general sea-level, and very likely that also has greatly changed. There are also many exaggerated statements in Mr. Davison's paper as to the way in which ignorant or sanguine people may have formerly regarded geology. For my own part I doubt very much whether there ever were any of these sanguine spirits, who have seen in every pebble or in every fossil evidence of a universal deluge. I must confess I never met them, or even heard of them before. I remember, when young, having often watched men while quarrying; and when they have turned up "fossils" from a great depth, some of them have said, "Probably these are the results of the Flood"; but I never found them giving expression to that sanguine view, that every fossil in the world gave evidence of a universal deluge! In the latter part of his paper Mr. Davison not only tells us that a universal deluge has been disproved by geology, but that it is impossible on other grounds; and he quotes some old and not very eminent writers to show that the idea of a universal deluge had been given up years before our scientific knowledge reached its present position, and that those who held it had to propound fanciful theories, like that of Whiston's, to support it. But I do not know why we should go back to Whiston and the others referred to. They wrote according to their own knowledge; but even their theories were not more fanciful than some of those which we have had in our own day, and which have, for a time, been considered true. In our own time we have had the boasted nebular theory, which has had to be given up. Within a few months it has been discovered that the granite itself, contrary to all previous theories, is a metamorphosed sedimentary rock; the very granite being nothing else than a watery deposit converted into its present state probably by the enormous pressure exerted in this globe, and by the transformations which are continually going on by crystallization. How then is it with the Deluge? Certainly we must not be too positive as to the literal words of Scripture; but we must be equally careful not to assume that everything now put forward as scientific is real science. For my own part I have simply had to unlearn, during the last twenty years, most of the scientific geological theories I was formerly taught; and it has been the same

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with most of us. Then with regard to the number of species taken into the ark, I am certainly glad to have anything like an anti-Darwinian opinion expressed, so long as it is expressed upon good grounds ; but I believe that Mr. Darwin's theory could not have won or kept its place among naturalists at all, unless it had had some kind of foundation on actual facts, upon which the more extravagant hypothesis which goes by Mr. Darwin's name has been based. If there is anything that modern science with regard to zoology bears testimony to, it is the reverse of what Mr. Davison tells us. We need not suppose that every now known species was taken into the ark : I thought the account says only all the genera—all the animals "after their *kind*"; and I do not believe there were so many species in the world 4,000 or 5,000 years ago as Mr. Davison assumes. Take the case of dogs : why, you are getting new breeds every day, and, in fact, we know very little yet of these extraordinary "sports" of nature. But in order to make out as strong a case as possible, Mr. Davison gives us these large figures, as showing the number of creatures that would require accommodation in the ark :—mammalia, 1,658 ; birds, 6,266 ; reptiles, 642 ; and insects, about 500,000. And why does he give us these 500,000 insects ? I never heard before that insects were taken into the ark. Mr. Davison tells us correctly from the Scriptures, that "all flesh died that moved *upon the earth*." But insects, as a rule, occupy the air. Then he seems inclined to think that some provision must have been made in the ark for the preservation of certain fresh-water fish. We know that brackish water will kill fresh-water fish in the present day ; but in regard to the Deluge, fresh water might in many places have been kept from mixing with the salt, or greatly diluted by springs : and I am not sure that we are entitled to ignore the element of miracle to the extent that Mr. Davison seems inclined to do. On the contrary, I think that if the narrative proves anything, it certainly proves the miraculous bringing of the Flood ; and I do not think it would be wise in us to say, if the Flood was brought miraculously, that there might not have been something miraculous also in the mode of sustaining life. Then it should be remembered that animals when in a dormant condition exist for a long time without food ; and so animals, when not moving about in their ordinary habitats, would be likely to live on a very small quantity of food, and not require as much as when roaming wildly through the forests. Some of the difficulties with regard to the supply of food for so large a number of animals may, therefore, be got over in that way. But I do not want to strain anything, either in the Scriptures or in science. I wish equally to avoid the misinterpretation of Scripture and the putting forward as veritable science mere conjectures and rash theories which are not worthy of the name. Certainly geology has not reached to that stage where its teaching can deserve to be called science, if we mean by science something which gives us definite knowledge. If we have any quasi-science in as yet a struggling condition, it is geology. According to geology now, you have no foundation even invented for any of the strata which have been laid down : we do not know in the least how or upon what they were first laid. We have had a theory

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among geologists as to the enormous intervals of time which would be required for the formation of each stratum, but no theory has ever been put forward to account for the existence of the materials of which the strata were formed. There must have been something in existence before these superimposed strata were formed—something on which they were deposited, as well as their own materials. Geology at present tells us nothing as to either. Unless, then, you take a large view of the question, and go into the origin of matter, and make your theories consistent and complete, you will find it difficult to deal with ;—unless, indeed, you accept Professor Huxley's explanation, that many superimposed strata have changed places, and that many of those things that look like fresh creations are the result of migration,—you will have the greatest difficulty in constructing a theory that will hold water for a moment. With regard to exegesis, though I am sorry to have exegesis of Scripture brought forward here, yet I know that sometimes it is impossible altogether to avoid it. But I think Mr. Davison is not very fair in his mode of using the Scriptures. Of course Matthew Poole and Bishop Stillingfleet knew nothing of the notions we have now, in the nineteenth century. That they wrote in reference to some of the notions current in their own day, is, I think, apparent from the context. But the exegesis of Mr. Davison is really not fair, and, indeed, it is scarcely worthy of his paper. He quotes from Deuteronomy ii. 25, these words of Moses :—"This day will I begin to put the dread of thee and the fear of thee upon the nations that are *under the whole heaven*, who shall hear report of thee and shall tremble, and be in anguish because of thee." The words "under the whole heaven" he puts in italics, and the words following are totally ignored, which completely alters the sense. The meaning is plain :—"the nations *who shall hear report of thee* shall be under the dread and the fear of thee." It does not say all the nations of the world, but only those "who shall hear report" of them. That is so obvious that I cannot understand why the words "*under the whole heaven*" should have been put in italics at all, when the next clause of the sentence so completely destroys the factitious value thus given to them. Then he quotes from the 11th chapter of Deuteronomy :—"There shall no man be able to stand before you, for the Lord your God shall lay the fear of you and the dread of you upon *all the land that ye shall tread upon*, as he hath said unto you." There again it is expressly stated that it is all the land *they should tread upon*, and not all the land under the heavens. How could they be expected to frighten people who never heard of them ? The thing is absurd. If we have Scripture appealed to, we should be very careful how we deal with it. It should be handled with the greatest reverence——

Rev. M. Davison.—I hope there has been no want of reverence on my part.

Mr. Reddie.—Not intentionally, I am sure ; but I do think there has been some carelessness. Mr. Davison quotes from St. Luke :—"There were dwelling at Jerusalem Jews, devout men, *out of every nation under heaven*." But surely such language does not imply a man literally from every individual nation in the world ; it only means an immense variety of persons from different nations. In the same way he quotes St. Paul, who says that the

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Gospel had been "preached to *every creature under heaven*"; but that only means its applicability "to every creature under heaven," for surely no man ever supposed that the Apostle intended it to be understood that *he* thought the Gospel had then been preached to every living man in the world! There is also a great objection to dealing with texts of this kind from the mere expressions in our vernacular translation, for we know very well that many of these sentences would require modification if we took the Hebrew or Greek originals so far as we have got them; and we must always further bear in mind that we have not the actual *origines* of either the Old or the New Testament, but only later versions, and we should therefore be all the more careful in dealing with exegesis. There is a similar straining by the use of italics in the quotation from Professor Hitchcock, on page 145 of the paper. "The hail smote *every herb* of the field and brake *every tree*." That applies only to the fields of Egypt, and not to the fields in other parts of the world; and it is not fair to put those words in italics. The passage implies only a local calamity, and not that every individual herb or tree throughout the world was smitten or broken. I have already noticed the next part of the paper summing up the arguments against the universality of the Deluge, brought from so many sources, but they are really not borne out by what we now know. I am not quite sure that we know what might be the prolificacy of the human race in those early days when men lived for so long. Certainly we should not be led to imagine that the human race were so little prolific, seeing that they, as well as the inferior animals, were created to replenish the earth. I am sorry to have had to make these remarks of an adverse kind, because the general tone of the paper is very excellent; but I think the author is one of those friends who is doing no little damage with the best intentions to do good. Mr. Davison has, I think, been a little too easy in accepting as truth many of these quasi-scientific facts, and regarding as science some things which are not worthy of the name. (Hear, hear.)

Rev. C. A. Row.—In answer to the observations which have just been made by Mr. Reddie, let me say that I never heard him reason so illogically before. (Laughter.) One thing did astonish me, and that was his assertion, which I have seen made in one of the papers of this Society before, that the mountains of Auvergne burst out into volcanic fire in the fifth century of the Christian era. When you consider what a mighty eruption that must have been, and that it left no trace in history, you must feel astonished at this assertion. Compare it with any other similar event: take the eruption of Vesuvius. We know when that took place; and we know that it overwhelmed Pompeii and Herculaneum, and made a most prodigious impression in history, although it did not occur in an age when it would have been likely to have made a greater impression than the eruption of the mountains of Auvergne would have done. There were plenty of authors in the fifth century—writers of the Church; and if such an eruption had taken place, it must have stamped the whole of the literature of that period from end to end——

Mr. Reddie.—Forgive me; I omitted to read, in order to save time, what

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we have in our Journal already on this subject; but what was omitted meets so exactly the point now adduced by Mr. Row, that, not to give him the trouble of going on with an argument which is totally untenable, I will now read the passage. In the sixth number of our *Journal of Transactions* (vol. ii. page 166) will be found a note on the extinct volcanoes of Auvergne, where we have the following, alluding to an article in the *Quarterly Review* of 1844:—

"Referring to the probability that the fires of Vesuvius might have been 'quenched before the soil of Italy had been trod by the sons of Japhet,' up to the time when they again burst forth in the days of Pliny, and referring to the remarkable omission of all allusion by that precise writer to the destruction of Herculaneum and Pompeii, the reviewer goes on:—'Concerning the destruction of Herculaneum and Pompeii Pliny says nothing,——.'"

This is the matter which, according to Mr. Row, ought to have made so prodigious a sensation in the history of the time!

"'—an omission so singular that, as Mr. Lyell truly says, it baffles all explanation. Nor is the void of Pliny's information otherwise than most scantily supplied by the sources which might have been expected to afford us aid. Amongst the whole body of Greek and Roman writers, three only notice the entombment of these polluted communities. Our knowledge of a visitation such as no human being had beheld since the destruction of the cities of the plain, is derived merely from the casual allusion of the epigrammatist, the confused hint of Tacitus, "Haustæ *aut* obrutæ urbes fecundissimâ Campaniæ orâ," and the tradition reported by Dion Cassius. Had Herculaneum and Pompeii never been discovered, the accounts transmitted to us of their tragical end would therefore have been discredited by the majority of critical inquirers, so vague and general are the narratives, or so long subsequent to the event.'"

You see, therefore, that what Mr. Row has just been arguing has been fully considered and disposed of already. I may observe that it is Sir Charles Lyell who is here called "Mr. Lyell" in 1844.

"Mr. Lyell thereupon wisely observes: 'This case may often serve as a caution to the geologist, who has frequent occasion to weigh in like manner negative evidence derived from the silence of eminent writers, against the obscure but positive testimony of popular tradition.' Perhaps even more remarkable than the record of the first outbreak, within the historical period, of volcanic activity in the Italian peninsula are the circumstances attending the memorials of the last known occurrence of such phenomena in Central France. During three years (458—460) Auvergne and Dauphiné were convulsed by violent and continued volcanic eruptions; streams of lava, bursting forth from the summits of the mountains, broke down the cones, which ejected continuous ignited showers, attended by earthquakes, shaking, as it were, the foundations of the earth. Thunders rolled through the subterranean caverns; so awful were the concussions, the sounds, the fires, that the beasts of the forest, driven from their haunts, sought refuge in the abodes of mankind. Strange as it may seem, these phenomena are commemorated by the usages of the Church, and inscribed in the pages of our Liturgy."

The argument Mr. Row was proceeding to urge from the supposed silence of contemporaneous writers with regard to the eruptions of the mountains of Auvergne, is therefore already disposed of. He is simply wrong. The article

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in the *Quarterly* is a long one, well worthy of consideration; and I am only surprised that Mr. Row has not paid attention to it.

Mr. Row.—I have read it. But what I said, according to Josephus, is unquestionable; and we know that Drusilla and her son Felix perished in the eruption of Vesuvius. But I will not accept the assertion in the *Quarterly Review* as true, because I do not think the *Quarterly Review* can always be quoted as an unquestionable authority for facts——

Mr. Reddie.—Do you assert that Josephus mentions the eruption of Vesuvius?

Mr. Row.—You will find the matter distinctly stated in Dean Alford's Greek Testament. In such an age as the fifth century, if there had been an eruption of the mountains of Auvergne, it would have produced an immense effect upon the literature of the period; yet we do not find in any of the great Church writers of that period any reference to such a phenomenon——

Mr. Reddie.—I beg your pardon. The reviewer proves just the contrary.

Mr. Row.—Well, if such a thing actually took place, it must have impressed itself more on the history of the period. Then Mr. Reddie seems to think that we should only look to philosophy, and endeavour to be always warring against it. But there is another issue raised when theologians come forward; we must then endeavour to show what the Bible says and means. I would draw Mr. Reddie's attention to the fact that some of his criticisms will not hold water at all. I wish Mr. Davison would read at this moment, for the benefit of the meeting, one or two little extracts which are important in a criticism of this kind, but which I cannot see to read myself——

Mr. Davison.—I will read them in my concluding remarks.

Mr. Row.—Very well. They are important in relation to any verbal criticism of the Old Testament, and are the result of much patient labour on the part of a friend of mine. How often do you think the word "world" is used in the Old Testament? I believe the word "earth" is used in the books of Moses some eight hundred times——

Mr. Reddie.—Is it the word *eretz* that is so used?

Mr. Row.—Yes. As to the words used by St. Luke, "And there were dwelling at Jerusalem Jews, devout men, out of every nation under Heaven," it is plain that that cannot be taken literally; but it must be borne in mind that in the New Testament exceedingly popular language is often used. I do not want to go into that portion of the subject, but I must take the strongest exception to Mr. Reddie's readiness to multiply miracles. I do not think we are justified in assuming miracles when miracles are not mentioned. It seems to have been against the practice of our Lord to multiply miracles: there are many places in the New Testament where you would expect a miracle to happen, but it does not come to pass. There has always been a great economy of miracles. Nothing can be worse than to construct hypotheses upon supposititious miracles of which the Scriptures say nothing whatever. I do not go with Mr. Davison in saying that the Scriptures do not lead us to believe that the Flood was brought on miraculously; but we have no right to assume a number of other miracles when there is nothing in the

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Scriptures to lead to that assumption. The Bible asserts that there were only two agencies used in the Flood: the fountains of the great deep were broken up, and the rain descended from the heavens. Noah was directed to get provisions for the sustenance of those in the ark; there was certainly no miraculous agency in that, and I do not think we have any right to assume miracles where the Bible is entirely silent upon the point. It is a very serious thing to attempt to assume miracles which the Scriptures do not assert.

Rev. Dr. Rigg.—Mr. Row has made some remarks which to some extent were anticipatory of what I wanted to say, especially in regard to the economy of miracles, which is one of the principles on which we are bound to interpret the Scripture. The more we study it the more we shall come to this conclusion, that the economy of miracles is a principle in all the procedures of the Divine Hand. I confess that in the whole I agree with Mr. Davison's paper, and I have held those opinions for many years. I feel that we owe very much to the men who, long ago, were bold enough to face a great deal of obloquy for the sake of looking fairly at science and at the language of Scripture, with a view to discern whether there were really any discrepancies between the two. It appears to me that the whole aspect of the narrative of the Flood is that of something miraculously begun, and done with great rapidity, but yet carried on in a sense calmly and peacefully upon the earth. The more we study the whole expression of the narrative, the less we shall think it consistent with depressions and upheavals to be extended all over the world, and producing contortions of strata in all different, opposite, antipodal parts of the earth. Even the olive-leaf brought into the ark by the dove seems to me to tell its own tale. Whilst the fountains of the deep were broken up, and whilst the rains descended to aid the growth and increase of the Flood itself, what followed must be described as having had a gradual character. Then, I never could understand, since I began to study the question at all, that it was in harmony with the principles of Providence that the Flood should have extended beyond the site at that time occupied by the family of man. Then, I think the difficulties in regard to genera and species have been very much increased, not as a matter of fact, but, in our view of them, by modern researches. I do not think that to say they were genera and not species would remove the difficulty, because true species are separate and independent; and, in fact, genera are not found as genera anywhere, but only as species. The genus is an idea embodied in the species which belong to it, and therefore I apprehend that there must have been as many pairs as there were species, provided they were true species. No doubt Mr. Darwin's theory has received sufficient support from scientific men to show that there must be some truth in it. It would certainly diminish the number of species there may have been at the time of the Flood; but, looking to the laws of habitat, and looking, above all, to the principles of which Mr. Row has spoken as to the economy of miracles in the Divine procedure, I think we are not compelled to believe in a universal, world-embracing flood. It is far better, more reasonable, and more religious that we should take the

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other view of it. That is the opinion I have in regard to the matter. As to geology, I think we are much indebted to Mr. Reddie for his knowledge of geology in tracking the subject out for us from time to time, and placing his finger upon points of contradiction. And yet we must admit that geology, though not a completely ordered science, has established a number of principles which can hardly be denied ; and not only a number of principles but a general order of strata with their proper fossils, notwithstanding very many lacunæ or apparent exceptions in sections of the vast field, of which all the facts are not yet thoroughly ascertained and studied. It does not serve us, in our study of Scripture, that we should seem disposed to deny so much, and allow solidity to so little in this or in any other science. Then, I must differ from Mr. Reddie as to the argument drawn from the language of the Bible. He quotes the passage from Deuteronomy :—"This day will I begin to put the dread of thee and the fear of thee upon the nations that are under the whole heaven, who shall hear report of thee and shall tremble and be in anguish because of thee." Mr. Reddie attacks Mr. Davison upon that simply because he does not take his view of it ; but I must confess I prefer the view of Mr. Davison. I understand that passage to mean :—"This day will I begin to put the dread of thee and the fear of thee upon the nations that are under the whole heaven"—the nations, that is, so far *as your knowledge from your centre extends.* (Hear, hear.) That, I apprehend, is the meaning of the passage, and then is added this distinct and emphatic form, for the sake of comforting, and encourging, and heartening them :—"The nations that are under the whole heaven, who shall hear report of thee, and shall tremble and be in anguish because of thee." I understand that there are two parts to that promise—first, that fear and dread shall be put upon the other nations under the whole heaven, and then the promise is amplified :—"Those nations who shall hear report of thee, and shall tremble and be in anguish because of thee." It seems to me a most majestic and emphatic promise ; but the last part of it seems to me a mere amplification——

Mr. Reddie.—Surely even that does not justify the interpretation given in the paper ?

Dr. Rigg.—I apprehend that I am right ; but if not, Mr. Reddie shall question me upon it by-and-by. Then, further, Mr. Reddie objects to the extract from Professor Hitchcock in the account of the plague that came upon Egypt. It is said that "the hail smote every herb of the field, and brake every tree of the field," and yet, says Mr. Reddie, "though it says every herb and every tree, it could not have meant every particular herb and every particular tree of every field." According to the literal interpretation, it means every particular herb and every particular tree within the limits conceived (hear) ; but what does it go on to say ? Why, that in a few days afterwards came the locusts, and "They did eat every herb of the land, and all the fruit of the trees which the hail had left."

Mr. Reddie.—Hear, hear.

Dr. Rigg.—Yes, precisely. It says in one place that the hail had left nothing, and immediately afterwards it declares that the locusts came and ate

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all that the hail had left! Then, there must have been something left. Here it is as plain as anybody could have it. There is a universal proposition which declares that all the herbs and trees were destroyed by the hail.

Mr. REDDIE.—"Smitten and broken."

Dr. RIGG.—It does not matter whether you say "smitten" or "destroyed"; it amounts to the same thing. In one clause you have it asserted that the hail smote every herb of the field, and in the next that the locusts ate up every herb which the hail had left. But if the hail smote every herb, how could it leave any for the locusts to eat? You may look at it for ever, but you can make nothing else of the passage if you are to have a literal interpretation. It is perfectly clear. You have it first declared that the hail smote every herb of the field, and then that after every herb had been so smitten the locusts came and ate up every herb in the same field. But this is an old story that has been noticed long ago. It teaches us that a universal phrase is sometimes used in the Scriptures in an accommodated and limited sense. It is for that purpose it has been used here, and that passage is fully to the point. Nothing can be more clear and decisive to prove that a universal expression is employed in a limited sense. Then there is the passage :—"There were dwelling at Jerusalem Jews, devout men, out of every nation under heaven." Mr. Row has given as much study to the language of the Scriptures as most men, and especially to the language of the New Testament, and I must say I agree with him that that passage is strictly in point. The assertion is that "There were dwelling in Jerusalem Jews, devout men, out of every nation under heaven." Mr. Reddie says that no one supposes that is to be interpreted precisely, because no one supposes it is meant universally. Therefore I say it is the more pungent illustration that there are phrases in Scripture having a universal sound, and a literal meaning, which are not to be understood in a universal sense. That is the very point Mr. Davison is aiming to prove, that you may use expressions currently which you have been so much accustomed to understand in an accommodated sense, that you do not perceive they are so much more universal than others. That is an absolutely universal phrase : "Out of every nation under heaven"; but yet no one supposes there were dwelling in Jerusalem Jews out of every nation in the world. Then there is the phrase, that the Gospel had been preached to every creature under heaven." Mr. Reddie says no one supposes that the Gospel had been then preached to every living creature. Exactly so ; and that is the reason why Mr. Davison has quoted the passage, because no one supposes it to have had a universal meaning. Therefore it is that that particular phrase is quoted as an instance of a universal phrase which has not got a universal meaning. It illustrates Mr. Davison's point that you may have phrases universal in their scope which are not to be interpreted in their full, absolute, universal meaning. But it may be asked, have the universal phrases used in describing the Flood to have no meanin at all? I say certainly they have a meaning. When we are told in the Scriptures that "all the high hills that were under the whole heaven were covered," we are to place ourselves in the position of Noah, at his centre

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and with his horizon, and imagining ourselves thus, and looking upon the field as then occupied by the human family, the Flood would be to his vision universal. The flood swept over the whole field which man inhabited, covering everything he could see. For the human family as then existing it was a deluge, which "covered every high hill under the whole heaven." Now I feel warranted in saying so much to show that Mr. Davison's views are not heretical, dangerous, or novel. I think his views are sound and substantial, making allowance for incidental slips and trivial errors, and I think they are the views which are likely to prevail. But whether they are or not, I think Mr. Davison did not merit the remarks which have been made in reference to his credulity, or to his careless use of Scripture language. With regard to the fact that we have not the *origines* of the Scriptures in the present day, I think it should be for the enemies rather than the friends of the Bible to allege that against us. The fact that we have not the original of the Bible is no reason why we should not make the best use we can of such materials as we do possess. I think the Biblical argument is well sustained by Mr. Davison in this paper. (Hear, hear.)

The CHAIRMAN.—Notwithstanding the objections of our excellent friend, the Honorary Secretary, I confess I am much inclined to follow the opinions of the author of this able paper. I consider that the Noachian account of the Deluge must have referred to a limited deluge, and not to a deluge involving the whole surface of the globe. If we content ourselves with the supposition that the Deluge was universal, we cannot do it without insisting on what I may call a superfluous miraculous interference with the ordinary course of nature. What does the ordinary course of nature mean? Nothing more than the succession of pre-ordained events which have been pre-ordained by the Almighty Creator of all things, and a miracle can be only an interference with the ordinary course of natural events—that is, with the events as pre-ordained and laid down by the Creator himself. Let me illustrate that by a single example, and take for the purpose the Marsupialia of Australia, a most remarkable class of animals. All the other mammal inhabitants of the regions on that side of the globe bring forth their young in a state of maturity, but these extraordinary animals bring forth their young in an immature condition, and they are matured by living in a pouch in proximity to the breast of the mother. It is a peculiar class of animals, and it existed originally nowhere else than in Australia. We know they can exist elsewhere, because we have them in our Zoological Gardens, where they breed their kind, and therefore they are capable of living in this climate. But if we assume a universal deluge, we must suppose that these animals were not only conveyed to the ark, but miraculously conveyed back again to their own country afterwards, which appears to me to be one of those strong cases of an inconceivable interference with the ordinary course of nature, for which we can see no necessity; and I quite agree that the interference with the course of nature is rarely had recourse to, and only where the course of events as determined by the Deity may render it absolutely necessary. There is an old quotation from a heathen poet, which is nevertheless applicable to

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this case, where the poet deprecates the persons of the divinities being unnecessarily introduced in the construction of their ordinary plays :—

"Nec Deus intersit, nisi vindice nodus
Inciderit."—(HORACE, *Ars Poetica.*)

That is, never let the Deity be introduced into your poem unless something important is to be gained by such interference. It appears to me that the presumption of some such miraculous interference of the Deity with the progress and course of events, certainly does not exalt the conception which every Christain would entertain of the infinite wisdom of the Deity. I must say for myself that I am strongly inclined to take a limited view of the Noachian Deluge.

Rev. M. DAVISON.—I shall be very brief in my reply, because other gentlemen who have spoken have so completely met and overturned the arguments brought against my paper. Our esteemed and excellent honorary secretary, Mr. Reddie, has called in question some of the facts to which I had occasion to refer in my paper. He has, for example, called in question what I said about the volcanic mountains of Auvergne, and has told us that a writer in the *Quarterly Review*, in 1844, declares that the eruption of those mountains dates no further back than the fifth century. Now this is really a question of authorities, and Mr. Row has said emphatically that he did not believe the *Quarterly Review*. We must be allowed to bring against the writer in that review the authority of such men as Lyell and Miller. It is a question of authorities ; and I believe the eruptions date much further back than the fifth century. With regard to the Scandinavian coast, Mr. Reddie says it has been recently ascertained that there has been no such great rising from the sea as was supposed. Well, even if we make Mr. Reddie a present of that fact, he does not doubt that there are subsidences and elevations going on ; and my argument, therefore, remains untouched. With regard to the question of species, I admit that it is a difficult question, but I am not yet prepared to accept Mr. Darwin's theories, as Mr. Reddie seems disposed to do——

Mr. REDDIE.—No, no.

Mr. DAVISON.—Then Mr. Reddie objects that the insects and some species did not require to be taken into the ark. But I would ask him, if they were not taken into the ark where did they find a habitat during the universal flood? There must have been some portion of the globe not submerged, and therefore the Deluge was partial and not universal, even on his own showing. (No, no.) Then he objects to my exegesis of the passage from Deuteronomy, as not quite fair. Dr. Rigg and Mr. Row have combated him on that point : but what have one or two texts to do with it? Mr. Reddie does not deny that the *usus loquendi*, both of the Old and the New Testament, is in favour of my theory. Take away a score of texts and still enough will remain to prove it. I will now read from the paper which a friend of Mr. Row's has drawn up. He finds that the word earth (*eretz*)

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occurs 821 times in the Pentateuch, 47 times in connection with the Deluge, 37 times in reference to the world in general, 50 times in reference to the soil or ground ("doubtful," he puts it), and 687 times in reference to particular countries. That shows what the *usus loquendi* is. So it is with reference to *adama*, the ground, and other words which I do not intend to touch upon. In conclusion, let me say that although one or two of the arguments may be considered doubtful, and although Mr. Reddie might have been able, if he had had longer time, to overthrow them altogether, still the argument is cumulative ; it consists of many parts ; and though you may prove I am mistaken in particular branches of it, still in its entirety it is so strong that you cannot resist the conclusion that the Noachian Deluge was local. I am the more convinced of this view, because our estimable secretary has only been able to nibble at details, and has not touched the fundamental principles on which my theory stands.

Mr. REDDIE.—That is all I intended to do. I did not attempt to controvert the whole paper ; but whenever papers are read here, I think it necessary to point out defects in the arguments, even though I am not prepared to join issue offhand with their conclusion. Therefore, a great deal of what Dr. Rigg said fell harmless on me, because I did not undertake to oppose the paper generally ; and I am content to let the arguments, *pro* and *con*, now stand for what they are worth, being certain that truth will prevail, and that truth is our common object.

The CHAIRMAN.—I am glad to find that so much real harmony exists in the midst of so much apparent discord. (Hear, hear.)

The meeting was then adjourned.

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ORDINARY MEETING, APRIL 5, 1869.

THE REV. WALTER MITCHELL, M.A., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last meeting were read and confirmed, and the following election was announced :—

MEMBER :—Rev. George Henslow, M.A., F.L.S., St. John's Parsonage, St. John's Wood, N.W.

It was also announced that the following work had been presented to the Library :—

"The Laws of Vital Force in Health and Disease." By E. Haughton, Esq., M.D., M.V.I. *From the Author.*

The Secretary, in the absence of the Author, then read the following paper :—

LIFE—BRIEF REMARKS ON ITS ORIGIN : BEING AN EXAMINATION OF SOME MODERN OPINIONS.

By J. HEWITT WHEATLEY, *Esq., F.G.S., F.L.S., &c., Mem. Vict. Inst.,* HON. LOC. SEC., *Sligo.*

IT is a grave misfortune for science and philosophy, as well as for our highest interests, that even a section of the scientific—men both by nature and education of high attainments—should devote its best energies to materialistic studies, till it gives to the material the pre-eminence due to mind; or so confuses the two together, as to get up a system which may bear the incongruous title of inorganic vitality.

Unfortunately, names occasionally leap into sudden fame, as the heralds of some startling announcement, conceived with ability and delivered with eloquence. It is taken up by many who never reflect that its claim to originality, or to well-considered and carefully wrought out-theory, has no better authority than either the support of evidences they have themselves borrowed from very doubtful sources, or hasty generalization from unsound philosophy and unsettled science.

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The multitude has either little time, or scanty inclination, to sift and to investigate. In fact, the multitude is not a thinker. It delights in being thought for; and wherever it finds thoughts which arouse its sluggishness by their eccentricity, novelty, or plausibility, it is apt to testify its approbation. How can that sluggishness be more effectually aroused than by having views presented to it, one single glimpse of which it never had before, and which are at the same time of the most exciting character—altogether foreign to its previous impressions? Where the wonder that audiences are attracted, like moths, to the new light? There is nothing surprising in that. But what is surprising, is the adhesion of any competent thinker; for there is nothing remarkable in the logic, or perhaps novel in the facts: it is the assumption, the inference, derived from the orator's imagination, that beguiles, and is altogether unworthy the table of science.

There is a portion of these, forming a class of earnest minds seemingly devoted to discovery in pure zeal for truth. It is to the teachings of such I would call attention in the present paper. For the most part, it is composed of men of high scientific knowledge, who, nevertheless, put prominently forward what I conceive to be a very grievous misapplication of physical studies—that the deductions they draw from their discoveries are in opposition to our faith. This is announced without scruple as without proof; yet I doubt not, in most cases, under the perfectly honest conviction that they are correcting erroneous views.

I will endeavour on the present occasion to show that its leading doctrine—the evolution of life out of the material world—is a pure fiction, at utter variance with true inductive philosophy. Whether I succeed or not, I shall be well satisfied if the attempt call abler minds to the discussion.

In attempting to establish this conclusion, I must refer to some modern works, full of talent and of truths, but false in deduction, which, from the abilities and the labour apparent on almost every page, are calculated to mislead to a very important extent.

A few of even professed writers on the subject seem rather to avoid discussion on the actual origin of life. They "blunder round about a meaning." They examine the husk and the shell with great perseverance and no little skill; but they penetrate not to the kernel. With the microscope at one end of creation, and the telescope at the other, their time is devoted to experiments upon, and observations of, the inorganic alone; whence, as we may reasonably suppose from

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contracted views, somewhat crude opinions result. These disciples of the elements are men who study the unintelligent so closely, intently, and perseveringly, that, strange to say, full of active intelligence themselves, they fail to recognize its necessity in the creation of the living intelligence of which they form a part. Hence, the miserable, petty, pottering creed, that life is a home-manufactured fabric of rough materials: more wonderful still, that the manufacturer is an inert mass or aggregation of masses. Let us look a little into this.

As far as I can make it out, our materialistic writers and lecturers seek to impress upon us the position that vitality is to be sought in the inorganic—and found.

Dr. Odling, in his *Animal Chemistry*, announces, "That all actions of the animal body are traceable to cosmical force; that in living as in dead matter there is no creation of force; and that any explanation of the phenomena of life which recognizes the agency of vital force is simply no explanation at all."

What is meant by all actions of the animal body being traceable to cosmical force? There are very strong reasons for believing, that every so-called natural force is but a mode of undetermined motion:—then life, if a natural force, is a mode of undetermined motion; and the power to will and to do, a myth; for as natural forces are not directed to any definite end, the willing to do and the doing must be involuntary—a contradiction in terms. At any rate, vitality is denied as an active agent, and is made to be somehow deduced from combinations of materiality.

Again, he says it is "abundantly manifest that the growth of a plant and incubation of an egg cannot be performed without a direct supply, and the development of animal organisms without an indirect supply, of external force." This is no argument in favour of the production of life by external forces. The plant and the egg have already life, before his external forces are brought to bear upon them. The application of warmth and moisture to the one, or warmth alone to the other, if only bestowed on the inorganic similitude of a seed or an egg, would hardly produce a plant or a bird. Life being present, its manifestation is brought about by certain external conditions. But the question at issue is, life *not* being present, would it be exhibited by any material combinations and applications of external forces? I believe not.

It is further said by the same author, that "by a reference to systems, and suns, and steam-engines, and mills, and telegraphs, I shall endeavour to satisfy you that the same

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forces are at work in living plants and animals, as in the inorganic world." It can hardly be denied that the same forces are at work in the living as in the inorganic world. The substance came from the inorganic. It is a portion of it, into which life was introduced; an introduction that by no means did away with the inorganic powers. It was addition, not regeneration.

As verging toward the production of the living from the dead, he observes,—"We now find that the chemist, like the plant, is capable of producing from carbonic acid and water a whole host of organic bodies; and we see no reason to question his ultimate ability to reproduce all animal and vegetable principles whatsoever." Are these organic bodies, or any of them, necessary to abstract life? It cannot be said they are; for there are abundant living organisms without one or other of them. They are only concomitants of certain existences; and predicate absolutely nothing as to the production or the continuance of life.

He gives us the formulæ of a great variety of organic bodies derived in the way he states. Take one by way of example: formic acid is found in both the vegetable and animal kingdoms. What is the result of its manufacture in the laboratory? It is one of the constituents of some living organisms; and what does the chemist make of it? No more than what an accidental combination in nature of the same ingredients in the same proportions could make—a dead body. Grant that not only many, but all, organic bodies—every one pertaining to animal and to vegetable—can be formed by the chemist out of the inorganic, it seems to me he is far as ever from life. There is every component part of life in the inorganic—but not life. We do not require chemistry to tell us this. Dust we are. There can be no denial of our inorganic framework. But that is just the point—framework. What worked up the frame into life? Between the dust we were, and the dust we return to, there lies a something which the chemist does not appear to grasp. He lays hold of the dust before it is animated; and he lays hold of the dust after animation has ceased:—the interval?—the living interval? For that, there is no formula: nevertheless, he sees "no reason to question the chemist's ultimate ability to reproduce all animal and vegetable principles whatsoever." It has been foolishly put forward that organic bodies were the product of life only; and as the chemist finds them where there is no life, he concludes, somewhat rashly, that the discovery of life itself is possible. The gross materials are there. He finds the block; but where is the statue? It must come

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from outward manipulation—from the chisel of the artist: whereas, simply by means of its own inherent powers of exfoliation, he would have the marble throw off the superfluous chips, and stand confessed a thing of beauty, without one trace of the rude block whence it sprang.

But may we not go further, and say, allow the faculty of vitality to the physical, allow the chemist's combinations to become life under his hands—he is working with the brightest and sharpest of tools, the human intellect? He is wielding the mightiest of all energies—mind. He is *living* power. He is exercising intelligence to work up matter to a state he never saw it assume of its own unaided energy; and of the past occurrence of which he has not the smallest particle of evidence. He has thrown the bright mantle of life around the fairy form in her lily bell. And what of that? He brought intelligence to bear; he applied mind to effect his purpose. If by the force of his own mind he thinks to bring life out of the insentient, why, since life is, should he not rationally conclude that mind had anticipated him? He says, no; the productive power is bound up in matter; and even if mind created matter, a law of vital production was impressed upon it; and there lurks life. Whether life is on the globe without the help of mind, or whether mind bestowed it conditionally on matter, his own intellect should in either case tell him that his endeavours are vain; for if it came without the aid of mind—fortuitously—he labours in the dark; there is not a shadow to guide him: it came without design, and aimless—an accident, an aberration. And if, on the contrary, impressed by mind on matter, it can only be made apparent according to the Will which impressed it, and not through the instrumentality of his own efforts of discovery. It is from that Will alone we can ascertain how the living appeared. The Supreme Will, being beyond the reach of human industry, perseverance, and sagacity, philosophy and natural history must be baffled. If we admit mind, we take life out of the province of the material; therefore no study of the material can aid our researches, beyond the germinative powers with which our senses make us acquainted: I mean, that we cannot add to the known causes of germination, that creative something which established those causes.

If life-giving capacity were bestowed on matter by the Creator, the appearance of vitality would still be to us an affair of the merest chance; for we have not the faintest, most transitory, ray of light whereby to elucidate the hypothesis. Unconscious matter, profoundly ignorant of the effective process, our consultation of it is vain. Shall we inquire of the

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microscope by what means it discloses a world of wonders, undiscoverable by the natural sight? Our examination of its separate parts elicits no reply. Intelligence bestowed the power; the instrument knows nothing of it; neither can it bring that power into operation without the further exercise of intelligence from outside: hence, a superintending power—mind, the active agent.

A serious question here arises—Can we control that creative mind? If we discover a means of producing life from the inorganic, we do control it; for we can then exhibit life at *our* will. Putting the impiety aside, will any man of science, acknowledging that life-power was granted primordially to the material, give us a scientific explanation how the human mind has acquired, or can acquire, intelligence at the least equal to that of its Creator? This were to deify humanity. Yet more than equal to Deity must we be to discover and to apply that which it was the appointed duty of matter to manifest under certain material arrangements; for if we extract life from what matter was created to effect, we are counteracting the original decree by the superiority of our own interference.

There is another view. Suppose power to produce life under certain concurrent circumstances of natural combinations, was bestowed on the material world, and then all left to take the stipulated course, there would be progressive motion according to the primeval impress. Wherein does physical science teach such progressive motion? The extent to which it goes in this direction is simply that of the original impulse communicated to masses as masses, and the regulated action of natural forces. In these we have nothing progressive; the masses move as they ever did; the great and the small phenomena of nature are to-day what they were thousands of years ago; nor have we reason to doubt but they will so continue as long as materiality shall be. Independently of this, see the absurd working of it:—

The processes of nature have been co-extensive with the almost infinity of distinct existences with which we are acquainted. Grant a single combination to have happened:—we have one life, say the lowest form of the algæ. How many thousands of combinations must have happened, to produce the number of species already counted of living things below animal life? And what a crowd, after the first animal life! Stranger still, each of these life-giving chemical unions of matter must have been varied in a fixed, peculiar, and determinate manner, for the elaboration of each one of the multitudes of distinct known existences. One combination must

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have occurred to send the tiger into the jungle; and another, to prepare the jungle for the tiger. Another, to set one species of fish swimming in the waters; and another, to produce one insect for its food. There must have been a peculiar arrangement for starting the feathered race; and a multitude of subsidiary arrangements in the feathery division to get up each distinctive tribe; and another multitude for the peculiar food of each.

From the smallest conceivable existence to the largest we know, the inanimate is called upon for myriads of separate and distinct commixtures for their production. There may be minds that can comprehend an aggregation of atoms, and an application of forces, bringing about an existence; then changing the formula, bringing about a second and totally different existence; again changing, and bringing about a third; and so on, till the peopling of the air, and of the earth, and of the waters, with animal and with vegetable in all their varied species, had been accomplished. I think the minds that can conceive it must have very wide margins for credulity.

This system,—or rather this purely speculative fancy, for system it is not,— is put forward by some, as showing the might and grandeur of Jehovah in an aspect far superior to that of a direct Creator. Can this detail work, however interesting and however beautiful they may consider it, compete with the majesty and display of Omnipotence, embodied in the most sublime line in the English tongue,—

"Let there be light,—and there was light"?

The Christian world is told that it believes the introduction of life to have been "done in a marvellous way, and not in the way of nature." How was nature itself done? Is there nothing marvellous in the creation of the physical? Think of the first appearance of that host of magnificent worlds now peopling space—and who can say, let their creed be what it will, it is not marvellous exceedingly? But we can learn without much difficulty many of the general facts of the material. We can bring its grand and mighty forces into our service; our messages are sent on the wings of electricity, and the wind is our servant. Hence, easier familiarity with the seen than the unseen. The real wonder seems to be, that through any pretence of science it can be said, the home and the food of life were *created*, while life itself was to *proceed* from that which was tobe its dwelling-place and its support.

One gigantic source of modern error on this subject appears to be the hasty deductions of geology, whereby we are shown

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what pretends to be an enormous antiquity for the world, and a number of successive appearances of new forms of life. This is quite fanciful; as may be easily conceded when we reflect, that geological science is yet unsettled in its own principles: it cannot, therefore, be accounted a safe guide when it plunges into conjecture.

The occurrence of all those broken-up patches of living things, or successive and multitudinous developments, are extraordinary enough. But, as if to exhaust completely and effectually the last remnant of our unsuspecting trust, we are called upon to believe, that, after all the vast numbers of changes at which I have hinted had turned up, there was a sudden cessation. It is not denied, that since man was on the earth there is other change in the material world than rearrangement of parts. Why should this be so? Why innumerable combinations to effect such immense works—and then no more? We are told, all the life we see, and much besides, was furnished by the inorganic. Why did it stop? As the result of mind, we could understand it; as the result of the mindless, I know not by what line of argument it can be maintained. It is perfectly explicable by the doctrine of one creation, for that implies a continuous act till complete; but under these lingering appearances, reason is at fault. Dr. Odling calls vital force a "fiction"; yet, making the assertion unreservedly, he fails to give us any insight into the original generation of life. He obtains organic compounds from inorganic substances. The experiments are interesting and useful. But every believer in the Bible is as well satisfied of the inorganic origin of his body, as the greatest chemist.

In *Animal Chemistry* we further read:—

> I have shown you that in the organism of the plant, carbonic acid and water are submitted to a constant deoxidising change, whereby they become successively converted into more and more complex bodies; many of which we are now able to produce; all of which we hope some day to produce by similar processes in the laboratory; that the change in composition undergone by carbonic acid and water is attended by a storing up of solar force in the resulting products; and that the correlative change in composition undergone by these products into water and carbonic acid is attended by a liberation of the force stored up in them; that in every organ of the animal body oxidation is continually taking place to furnish that organ with the force necessary for the performance both of its nutritive acts and external manifestations.

In the first part of this paragraph, we have deoxidation producing more and more complex bodies. In the latter part, we

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have oxidation furnishing every animal organ with its powers. Hence it would seem, that deoxidation was a sort of substitute for mind—inventing, improving; and oxidation, a sort of substitute for vitality—supplying force and invigorating—the parent of every nutritive and external act—the furnisher of all organs with their respective powers. How can we interpret this, save that oxidation is the life in the animal, derived from what deoxidation puts together in the vegetable?—that a living muscle requires the stimulus of oxidation to force it into action? and that vitality is a secondary affair in the scheme of organisms—at the very most, only promoting oxidation, which does all the work? There is some ingenuity in thus pulling down the value of life: it is a great object with certain philosophers, and facilitates the introduction of minor projects;—such as the manipulation of the inorganic in search of life—development—et hoc genus omne. If this be a true exposition of the writer's meaning, he agrees with Mr. Darwin and the author of the *Vestiges;* the latter appearing to have furnished the former with his system; for he says, "The organic rests on one law, and that is—development." In the midst of these various proceedings, solar force is introduced. The change in carbonic acid and water, dependent on deoxidation, induces the resulting products to imbibe a certain amount of sun-force. It does not here seem to perform any vital function; for we read, that oxidation supplies the power requisite for every organ to perform its part in the system. In another place, however, we find the following:—"We perceive that muscular exertion does not proceed from vital force generated within the body, or, indeed, from force of any kind generated within the body, but only from a liberation within the body of pent-up solar force, which at some time or other had been rendered latent in the separated carbo-hydrate of our food on the one hand, and oxygen of our breath on the other." So that now, oxidation is found not to suffice; and the sun is made the agent in furnishing the muscular power.

Just before the last-quoted passage it is said:—"In the attempt to lift a heavy weight, the oxidation of muscle within our bodies produces a direct liberation of heat instead of motion." We seem to have a little complication here. It does not appear that oxidation now furnishes every organ with the necessary and appropriate powers for the performance of external acts. It ministers to the liberation of sun-force; which then becomes the origin, and thenceforth the exhibitor, of muscular manifestations. If oxidation simulated life, what need of penning up sun-force, and liberating it again, to produce the same result? The source of muscular power,

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according to this theory, is either a portion of the material world absorbed by another portion, or a portion of the material absorbed by the living. Can material acting upon material, generate anything but material? Whatever may be the combinations of natural products, and whether they absorb sun-force or any other material motion, the experimentalist is dealing with nothing but the inorganic, yet expects the elimination of life. But if sun-heat be absorbed by, and become latent in, an object not inorganic—in vegetable, for instance—and so conveyed to animal in its food, we have now matter acting on life. How can that matter perform any function of life, since life already was? It cannot be pretended that sun-heat is life; for it is said to be imbibed by life: it may, therefore, be a part of living tissue, but not itself producing that tissue.

A great deal has lately been made of this absorption of sun-force, either by matter or organism, and its subsequent liberation. Rub two pieces of ice together, and they will be melted by the generation of heat during the process; or, rather, according to the doctrine of latent heat, by the liberation of formerly stored up sun-force. That heat is an accompaniment of friction, no one doubts. Does it necessarily follow it should have been previously imbibed, whether directly from the sun, or indirectly through former metamorphoses? We are assured that such is the fact; that sun-heat has been received and become latent till the application of the test for reproducing it. Granting this to be, we can, from no structural studies whatever, gain a knowledge of the introduction of heat into bodies, any more than by dissection of the brain, we can track thought to its home; and by looking on the cerebral convolutions, determine their revelations.

According to the sun-force theory, organisms must be perpetually giving it off as long as life endures; continual re-absorption going on to supply the waste. And this, we are told, is accomplished by the heat which had been rendered latent in the food we consume and in the air we breathe; the powers of the animal, so far as sun-force is concerned, must therefore be proportioned to its appetite and capacity of lungs.

It seems then to follow, from their own arguments, that all living things, if not exactly children of the sun, are greatly dependent on sun-force, as one of the conditions of life accompanying constructive organization; other material combinations being further conditions of life. It results, therefore, that neither separately nor conjointly, can these be the life, or produce it; nor of themselves manifest inde-

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pendent action. Both chemist and anatomist are dealing with the matrix alone; the informing spirit is beyond the ken of the material student.

Force cannot create itself; nor, when created, assume creative rank. The diffusion of vitality now requires the agency of vital power. Does it not follow that its original issue on earth required vital power too? If the present perpetuation of life can be no otherwise than through life—which is an undeniable truth—the introduction of life on the globe must have also been through life: it was, in fact, only perpetuating it—only introducing the principle to another sphere. This latter, we call creation. But it was as surely life giving life then, as it is now. It is a strange perversity that claims life as necessary to life at one period and not at another; that the intromission of life was radically different from its maintenance; that it came by inorganic action, and is kept up by vital. If it were continued by inorganic action, its inorganic origin would be intelligible: being continued by vital action, is not its vital origin equally intelligible? Is there a second method by which philosophy can avoid the confusion of the material *then* and the immaterial *now?* I do not know of it. Let us not be deceived by the word, creation: it is but the first *view* of life; which by no means infers it was the first existence. Life is eternal; which is philosophically proved, to my mind, by the doctrine of similarities;—the present, in its connection with past and future, is a portion of immortality—the continuance of what was, the embodiment of what will be.

The sciences of chemistry and anatomy are highly interesting and useful. Indeed, I am strongly impressed with the notion that chemistry's search after this modern philosopher's stone will accomplish as glorious an advance in itself as that from former alchemy to its present high position. It were almost more than rash to affirm as much for modern comparative anatomy, as sometimes pursued.

A word or two now on Mr. Grove's *Correlation of Physical Forces*.

The subject appears to be treated with great ability. That the forces with which he deals are correlated I am quite willing to grant to the full extent he claims for them, except in the case of motion, which I cannot understand as a force, but as the expression of forces. That the rest of those named by Mr. Grove—heat, light, electricity, magnetism, and chemical affinity—are correlated I think he satisfactorily shows. But there are others which he does not name, air and water, for example,—both natural forces of great influence. Is there cor-

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relation between these and the others? I imagine not. How can air or water become light? or light be liquefied? Unless all natural forces be correlated, general deductions from the correlation of a portion of them must fail. Correlation of part of the natural forces cannot govern the whole, nor can it therefore lead to any definite conclusion in our study of natural phenomena.

If it be intended to connect the doctrine of correlation of forces in any way with vitality, I conceive it must be unsuccessful. Mr. Grove quotes Dr. Carpenter as suggesting "the probability of extraneous forces, as heat, light, and chemical affinity, continuously operating upon the material germ, so that all that is required in this is a structure capable of receiving, directing, and converting these forces into those which tend to the assimilation of extraneous matter, and the definite development of the particular structure." The material germ remains to be discovered. If it were under our hand, it might receive extraneous affections, as water receives heat; but directing is a property of life—perhaps even confined to its highest forms. The water does not direct the heat in the production of steam. The external force may direct the material structure, but the directing is as unpremeditated as the impelling physical movement is involuntary. Instead of this, the very material structure itself is called upon to direct those forces to an invariable and given end, converting them into other forces tending to form a totally different structure —meaning, of course, living structure. Is this so? Mr. Grove inclines to the affirmative, and supports his views thus: "As by the artificial structure of a voltaic battery, chemical actions may be made to co-operate in a definite direction, so by the organism of a vegetable or animal, the mode of motion which constitutes heat, light, &c., may, without extravagance, be conceived to be appropriated and changed into the forces which induce the absorption and assimilation of nutriment, and into nervous agency and muscular power."

Now, I think this may not be received without the greatest extravagance. There can be no doubt about the actions of a voltaic battery. But in all such reasonings it appears to be forgotten that life is there the directing power, not the insensate machine, nor the force with which it is connected. It is organism working to a specific purpose, not physical forces appropriated and changed by the material machine or directed by it. Life charges the battery, and guides the results. Vital power is the operator throughout, by means of its exponents, the brain and the muscle of the operator. It is vitality compelling the elements; not the elements engaged in

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organic operations. Thus vitality appears to be out of the reach of material combinations; *it* controls *them*, and is consequently a power superior to them. Grant the wild supposition that life is eventually produced from inorganic elements, will that show us what those elements can perform? I do not quite see it. The only fact adduced would be that life was there; not that the unaided physical could bring it forth. You, as a living machine, are putting together, of purpose, what you expect as a voluntary gift from dead machinery. If life sprang up under your manipulations, do you expect materiality to compete with intellect? No matter what forces are bestowed on machinery, it requires extraneous power to set it going, and to keep it going.

Yet another point;—can the mind of man conceive progressive motion originating in matter? Mr. Grove announces a great truth in saying, "It is an irresistible inference from observed phenomena that a force cannot originate otherwise than by devolution from some pre-existing force or forces." This drives us out of the material world for the pre-existing force. Although Mr. Grove starts by setting down motion as a force, he is inclined to believe, and on very strong grounds, that physical forces are but modes of motion. I also believe that motion is a result of those affections of nature we call forces; and the forces, themselves, derivative motion. Since, then, motion does not originate in matter, as a distinct motor—as all known forces devolve from anterior force—and since we cannot comprehend other origin for them, we cannot seek for the pre-existing force among natural phenomena. It can only be—as the inevitable consequence of this inquiry—a force foreign to the inorganic; a power above and beyond all natural forces.

In his address to the British Association in 1866 on "Continuity," Mr. Grove, speaking of an elephant arriving on earth, without having had antecedent progenitors, says, "I know of no scientific writer who has, since the discoveries of geology have become familiar, ventured to present in intelligible terms any definite notion of how such an event could have occurred: those who do not adopt some view of continuity are content to say, God willed it." Can our philosophy or our science lead us over the boundary of the physical? On that boundary, we are tottering on the outermost edge of philosophy's teaching: one step more, and we are in that beyond, which science cannot penetrate. This seems to be a chief reason why some contend for the supremacy of matter. They would bring everything within the compass of human reason; so they trammel the intellectual;

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they bind it to the horns of the mountain; they chain it to earth; they force it to minister in the temple of the rocks. Where science ends, faith begins. As the unseen cannot be brought under the influence of human skill, it is either altogether rejected, or an influence conceived delegating life-production to inanimate nature. This latter has become a not very uncommon notion. A power is acknowledged, superior to the material creation—out of the sphere of science—in the domain of that which evidences things unseen. Why does their faith stop at the restriction of life to subsequent conditions of matter? The followers of this creed acknowledge faith up to the point they think their own peculiar views require. Having any amount of faith themselves, why should they try to break down that of another, whose belief is a little more than theirs? If they have any, they admit the principle. It is only in degree we differ, not in kind. They are talking contradictions when they would put down the Biblical believer, whose creed is the most extensive and truest continuity; for it counts back from all our surrounding organisms, till, lost in the earliest inorganic formations, it recovers them in eternity. On the border-land we meet face to face the question, Where now is life? The index points —beyond.

"Those who do not adopt some view of continuity are content to say, God willed it." By what view of continuity can we account for the arrival of the elephant on our planet? There are many, like the humble individual now speaking, who can only track the elephant of to-day to the first elephant on earth. Is there a monad for the elephant, a monad for the condor, and a monad for the pampas grass? or do all these originate in one monad? If each of them have separate and distinct origins in matter, may we expect a recurrence of the combinations which produced them, and consequently a fresh supply of elephant, condor, and pampas grass? or why, if all have one origin, should the thing springing therefrom, even in millions of ages, get split up into these distinct forms, which, when assumed, become permanent? and why it should not have stopped at various intermediate forms, making these the culminating points? In short, why was form arrested at all? The law of its arrest, derived from unconscious matter, presents us with a truly miraculous uniformity; for which, neither the development, nor any other system with which I am acquainted—save that of the Bible alone—can account.

The last quotation is part of a commentary on a freely translated passage of Lucretius, which ends thus:—"If he"

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(the elephant) "had no antecedent progenitors, some such beginning must be assigned to him," as that "he fell from the sky," or "appeared out of the cleft of a tree," &c.; —anything but recognition of a personal Creator.

What was this animal's antecedent? As the idea of his first appearance on earth, in his perfect form, is held to be only fit for ridicule, he of course came from some embryotic state, either in his existing or other form—a germ. From all the materials within the scope of human knowledge, the only notion of a germ we can establish is that of reproduction. The *first* was obviously not reproduced. I am, therefore, constrained to believe in a pre-existing creative Power. To whatever minute point we ascend, that point has life: confining ourselves to earth, no form of continuity can therefore reach life's origin.

There are some arguments, again, brought forward in support of continuity, which to the best of my belief are neither new nor true. "If an animal seek its food or safety by climbing trees, its claws will become more prehensile . . . . each portion of the frame will mould itself to the wants of the animal, by the effect on it of the habits of the animal." So continuity enforces the doctrine, that the giraffe got his long neck by trying to obtain food out of the reach of shorter vertebrata; in fact, that animals were produced by this most unnatural natural system, in striking opposition to their former wants, brought forth for one course—the terrestrial—urged on to another—the arboreal—by what? their nature? their instinct? Then they had one nature and one instinct in the early part of their career, and another nature and another instinct in a later part. This is too subtle for my comprehension. I can make nothing of it but a flat contradiction. The animal's requirements are at variance with its powers! Desires and necessities are bestowed upon it, together with impotence of attainment! What manner of thing is this? Transmigration of souls is as the wisdom of Solomon to it. I suppose it is done in what they call the "way of nature"; nor is it a bad illustration of what we might look for under the rule of unreason.

On this point Mr. Grove appears to go the whole length of Lamarck, one of whose illustrations is that of a bird driven to seek its food in the water. The wish for locomotion on that element induces it to strike out its feet; the toes spread; a membrane between them would be very convenient; sufficient practice at the new exercise induces the skin at their roots to extend into one, and the webbed foot is accomplished.

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One of the curiosities of literature may be found in tracking the effects of different authors' ideas on cognate subjects. Lamarck talks of the shore-bird feeding at the muddy edges of the water; and to avoid sinking on the soft substance, stretches its legs to the very utmost, and the consequence is the establishment of the long and bare-legged waders. The author of the *Vestiges of Creation* speaks of the colonizing principle of certain wading birds, which might have advanced into "dry grounds and woods; elected to the new life perhaps by some of those varieties of appetency which occur in all tribes; thus exposing themselves to new influences, and ceasing to experience those formerly operating, until by slow degrees, in the course of a vast space of time, the characters of the pheasant tribes were evoked." Lamarck sends the shore-bird into the mud to get his long legs, and the author of the *Vestiges* plucks him back again to resume his short ones, at the same time converting the spoonbill or the stork into the pheasant.

Fœtal inferiority is again advanced in the address on "Continuity," as supporting its views. I do not see how it is possible to sustain an argument on the adult and perfect, from the unborn. Progression to the typical, implies imperfection in all the uterine stages up to the last. I am afraid Harvey must bear the blame of promoting the doctrine of embryonic lowliness, and the deductions thence ensuing; for he speaks of the gradual development of the embryos of all animals, from the structureless mass to the perfected creature; yet neither the elaborate chapter in the *Vestiges*, nor the adhesion of any present writer, shows more or less than that the embryo of each race produces its like; that the bird never stopped short at the reptile, nor the mammal at the bird. If the first stage were the perfect image, there never could have been any other stage. Uterine growth is nothing more than the gradual perfecting of the *kind;* fitting it up for the after-purposes of its peculiar existence; of necessity, therefore, not fully formed till the period of parturition. Through whatever stages the embryo may pass, the idiocrasy is never lost—it is true to its kind in the first stage as the last.

Rudimentary organs are again pressed into the service; and which—as we read in the last cited paper on Continuity—"must either be referred to a lusus naturæ, or to some mode of continuous succession." Take the Apterix. It cannot be a lusus naturæ, for that is an abnormal growth; whereas the Apterix produces its like. Here we find the wing of the bird reduced to the lowest rudimentary form—a mere stump. Continuity says, this effete wing is derived from continuous

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succession and modification from wing, properly so called. I cannot trace the steps, and think there are strong reasons for believing there are none. The whole of the bird's bones are solid; not hollow, for the sake of lightness, as in flight-birds. The sternum is a mere buckler, without the keel of the flying tribes; neither has it any abdominal air-cells. The whole frame is utterly opposed to flight. It is that of a purely land animal. If the ancestors of this terrestrially-made bird ever flew, I could understand how, from long disuse, it might have lost its flight-powers; and how, the same conditions always present, they might perhaps gradually wither quite away. But why should that part of the osseous structure, unconnected with the organs of flight, be so generically changed? The entire bulk is unadapted for flying, not the rudimentary wing alone. If it be argued by the continuitist that the frame has changed for the descensive reason that abolished the wing, he is making the frame in its totality an engine of flight, which is untrue of any bird. Again, do the warmest advocates of continuity pretend that it adds to, as well as takes from,—at least where they are making use of the argument of rudimentary organs? In the present example, we have this gradually "worn-down" wing furnished at its extremity with a hook. How can we account for the phenomenon of addition? I see but one principle which can do that; the ancestral Apterix possessed the same instrument, and therefore never had a true wing.

None of these citations appear to be very well calculated to sustain the system of continuity.

In this class of thinkers, a good deal of argument will be found bestowed on the confusion of primary and secondary powers. "If," says Mr. Grove, "we now assign to the heat of the sun an action enabling vegetables to live by assimilating gases and amorphous earths into growing structures, why should such effects not have taken place in earlier periods of the world's history, when the sun shone as now, and when the same materials existed for his rays to fall upon?" His rays are called upon to aid in keeping existing organisms alive; which is all he can be proved to do now, and which he always did since vegetable was. Before then, there were the "materials," but nothing else. The sun is one of the aids in reproduction; how can we thence argue that he brought the first vegetation into life? There are no more grounds for this, than to consider original introduction and subsequent reproduction the same act, or effected by the same means. The difference appears to me as obvious as that between the seed and the plant; the plant springs from the seed, which is

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reproduction; the seed is first formed on the plant, which is production.

In spite of all the volumes, and the addresses, and the lectures that have been written and delivered on the subject, the truth after all seems to lie in a nut-shell; the seed being produced by the plant as a provision for the perpetuation of its kind, necessitates in the first plant an origin anterior to seed. I apprehend this is a legitimate inference from what we know; for, as far as I am aware, no philosophy and no science can show reason for reversing the natural law, that descent is from the perfect formation. The plant is visibly the parent of the seed; and as visibly is only perpetuated by it. That the exact opposite occurred in the case of the first life, is neither philosophical nor scientific (unless I greatly misunderstand those terms), and for which I can find no warrant in nature. You may reverse the argument, and tell us, the seed visibly produces the plant, and is therefore the parent. But you are likewise reversing the process of nature. I think by strict inductive philosophy, we may obtain the following formula of creation. To propagate the plant we first take the seed from itself; we can therefore follow up seed from plant to plant to the first *plant*. You cannot follow up plant to the first *seed*. You say, we sow a seed and a plant arises—the seed is first. Argue that upward. Whence came the seed you sowed? From a previously existing plant, which came from a seed too. Leave this seed, then, as the first of the series. Why not? Because the earliest knowledge you have of seed is from the *bearer* of it—the seed's producer—the plant: hence the plant had precedence—the seed came after; and also because, though seed is the mode of defence from extinction, it is only from the absolutely complete that seed is derived—that complete must therefore be, or have been, for seed to be.

So of all life.

Under the material doctrine of life—whether as issuing from matter unconnected with previous impress from without, or wrapped up in matter by the Creator for future development—the philosopher is stopped, not only before he touches upon existence, but before he has investigated the unintelligent substance of his own planet with sufficient accuracy to determine, not merely its life-originating, but even its life-sustaining powers. On the very threshold we encounter uncertainty. A preliminary inquiry has not met with a satisfactory answer. So comparatively simple a thing as root-function does not seem to be clearly ascertained. M. Corenwinder not long since read a paper on this subject before the French Academy, in which he detailed some interesting experiments,

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showing that a portion of the carbonic acid found in the root must have other access than by absorption; the quantity of the acid being invariably greater than that supplied to it, whether as gas or solution in water. Where does the surplus come from? While we are ignorant of common root purposes —of mere vegetable feeding on the inorganic—it must be a daring hand which shall aim at plucking life from that whereof we have such scanty knowledge,—of the very mechanical contrivances of which we know so little.

Dashing assertion is not, however, wanting. In Dr. Page's work on "Man," the following is quoted from Professor Huxley:—"The whole analogy of natural operations furnishes so complete and crushing an argument against the intervention of any but what are termed secondary causes in the production of all the phenomena of the universe, that in view of the intimate relations between man and the rest of the living world, and between the forces exerted by the latter and all other forces, I can see no excuse for doubting that all are co-ordinated terms of nature's great progression from the formless to the formed,—from the inorganic to the organic,—from blind force to conscientious intellect and will." Divide this materialistic creed into two sections. We have first, that analogy of natural operations completely establishes secondary causes in the production of all phenomena; and second, that the phenomena of the universe are co-ordinated terms of nature's progress from blind force to intelligence.

1st. If secondary causes are to be judged by analogy of natural operations, they are nothing more than re-arrangers and reproducers, all we know of natural operations being re-arrangement of physical, and reproduction of vegetable and of animal; the analogy, therefore, reaches at furthest to the reproductive powers of nature—not to the productive. I cannot see the crushing argument against a primary force producing those secondary causes. They are themselves "phenomena of the universe," producing other phenomena; and by consequence dependent on their cause, as these latter are dependent on them. Their place in creation is that of re-agents; they manifest and determine the presence and character of the Great First Power.

2nd. That the phenomena of the universe are co-ordinated terms of nature's progress. So that, no matter how the universe was made, all its phenomena are only gradually unfolded with nature's onward movement "from the formless to the formed." Though there is no direct denial that the universe may have been created by Divine Power, there is denial of that Power having created any of the attendant

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phenomena. There is some confusion here. The lightning flashes,—the magnet attracts,—storm desolates,—the sun gives forth his warmth,—electricity circles the world,—light envelops creation—are not these phenomena of the universe? are they not integrants of it? could the universe be, without them? To what phenomena, then, does the Professor refer? and wherein lies the difference between its phenomena and its operations? Whenever natural history seeks to explain the genesis of nature by natural means alone, I cannot divest my mind of a feeling of vagueness, of assumptions, of incompleteness. Even granting a force originally invested in nature, capable of throwing off all the magnificence of space, and sustaining it, by the slow degrees claimed for its works, that does not remove the materialistic creative movements: we can only recognize a power bestowing power—the creator of the material, leaving it to exhibit both the living and all the material phenomena flashed upon us from myriads of the sublimities of unlimited grandeur:—a shapeless mass was therefore the only act of true creation! a shapeless mass from which all else was—developed! a shapeless mass which filled space with glory—which gave forth life, and death, and immortality!—a wondrous creed—a conclusion wild and unphilosophical.

In the work on "Man," just named, every one knowing some of the author's previous works, would of course be prepared for strong opinions in favour of the geology whose fundamental principles have never been settled, and for the whole succession of imaginative deductions which might reasonably be expected from such premises; but I was surprised and pained to read the following:—"It is of no use, then, when new questions like the present are mooted, for certain minds to work themselves into a frenzy of orthodoxy, and savagely smear themselves with theological war-paint, and raise the old war-whoop of the Bible in danger." The man who could scatter opprobrious sentiments like these, broadcast, instead of the soft word and the hard argument, must have imbibed such a bitterness of prejudice, as to be hardly trustworthy when estimating the preponderance of credibility for or against the Bible.

In the same essay there is one quite new doctrine taught—at least new to me—that "time is without limit." It is well to have prepared an eternity, to work out the results of a philosophy which teaches the development hypothesis, that there was no such thing as independent creation unless of the physical, and of that physical without its phenomena! Although this speculation may have an eternity for its school-

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room, I may be allowed to doubt whether its scholars will ever perfect their task.

A hypothetical nest for the living once fairly imagined, harsh denunciations against life being a direct creative act, are rather largely indulged in, as will be found in those writings where material devolution is taken up against direct creation. In the last-named work, Dr. Page says, that the essential difference between man and the animals immediately beneath him, "was not a thing brought about by a direct and independent act." Man was not created, is the theme. Nothing was created except a lump of the inorganic, is also the theme. Everything besides proceeded thence, according to the aboriginal plan of the creator of the nucleus.

This is the best side of the materialistic theory—matter impressed by the Deity with all that has appeared; and, according to some, with much more still to be developed. Even here we do not lose that contradiction, the material generator of the living. So determined is this scientific section the natural world shall be claimed as our origin, that strong efforts are made to get at the ultimate particle which eventually becomes the perfect organism. Strive as you may for the ultimate principle of germinal matter; subject what you will to the highest microscopic powers we have; go further—bring in imagination to your aid; let the mind conceive subdivision of matter until its powers of conception are lost in the vast calculation—the last glimmering of connected thought in relation to the mass is still a divisible entity. This is not what we seek. We have not arrived at the ultimate particle. No powers possessed by humanity ever can. And if they could, the ultimate particle is not the life itself. All reasoning shows that the ultimate particle must be matter. Does matter, as such, grow? Who can say it does? Every effect of nature's mightiest powers is but change of matter; we can detect no signs of growth. It is life that grows; and though it may require the inorganic for its sustenance, it is life that, feeding on the unformed, occupies more and more space, and assumes fresh forms utterly unlike those whence its nourishment is drawn, till it reach the perfect vegetable or animal according to its kind. It might seem of small consequence, whether material food under the assimilating powers of life, becomes instrumental toward future size and form, or whether matter grew, being alive. But the whole question hinges on this; for if matter grew, being alive, life would proceed from matter: whereas, matter being acted upon by life, life is more independent, and eventually becomes the visible ruling power of the material world, so far as its constitution is suitable.

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It would seem, then, we are driven to one of two conclusions—either that certain particles of the inanimate are directed upon certain other particles of the inanimate for active formative purposes, and developed as the necessary conditions arise; or that there is a Power independent of, and superior to, and directing, inanimate nature—the immediate Creator of life upon the globe.

I have thus endeavoured to lay before you, as briefly as I could, a few further observations on the origin of life; tending to show that life could not have proceeded from the inorganic, by and through the means of the inorganic; that the perfect form was the original creation; and that existence must therefore have necessarily come from outside the material body—not in the sense of life-productive power having been bestowed on that material body for remote development—but direct from a source having life before its manifestation here as life.

Note.—Throughout this sketch I have often used the term "force" as applied to physical phenomena. I have only done so in accordance with the theories on which I have been commenting; my own view being that there is only one force, either in our world or out of it—Mind; the mind co-existent with Eternity, co-extensive with the Limitless; and the mind of man: all else is motion.

The Chairman.—I propose a vote of thanks to the author for his very interesting paper on a difficult and obscure subject. The subject is so obscure that we must expect obscurity in some parts of the paper; but on the whole Mr. Wheatley has treated the main parts of the subject in a very satisfactory way. It is a subject that deserves discussion; and I hope it will elicit a good one, especially as some of the questions involved in it are now being brought very prominently before the scientific world.

Mr. Brooke, V.P.—I shall be very happy to make a few brief observations on this paper, and to supplement them by some further observations directed in answer to a lecture which was delivered some little time ago in Edinburgh by Professor Huxley, and which has since been printed in the *Fortnightly Review;* and I shall endeavour to point out some few of the errors into which the author of that lecture has fallen. There are many points in the paper before us which would bear some remark; but I shall only refer to one point to which I hardly offer an objection, but in which I think the author has fallen into some confusion of ideas in regard to forces. The term "force" is perpetually confounded with what force produces, as I have already pointed out on a former occasion. In the case of artillery, you speak of the force of

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the gunpowder, and of the force of the shot. Now the gunpowder has force, which is the power of propelling the shot; but the shot has no force at all—it has only energy; that is to say, the shot has the power, when propelled, of effecting destruction by dealing a heavy blow; but it has no force. That is merely one of a thousand different examples that might be given of the erroneous application of the term "force"; "force" should be limited to that which produces energy. But what I wanted to point out was, that Mr. Wheatley, in speaking "of the rest of the forces named by Mr. Grove—heat, light, electricity, magnetism, and chemical affinity,"—has fallen into the error of confounding force with energy. What Mr. Grove speaks of as forces are certainly not forces, but the results of force. But the author says: "There are others which he does not name—air and water, for example; both natural forces of great influence." Now what idea he can have of force as comprising the qualities of air and water, I am at a loss to conceive. I cannot imagine what definition of force can be given to include air and water. I think that is a little oversight on the part of the author. But the paper is a very excellent one, and it contains much sound argument. As the subject before us is "Life and its Origin," I may now make a few remarks on Professor Huxley's paper, which is entitled "On the Physical Basis of Life," and I will endeavour, in a few words, to give you an idea of the substance of that paper. Professor Huxley begins by stating that "protoplasm," which he translates into "physical basis of life," is the material from which all organized beings are formed. He is quite right in stating that that protoplasm, or physical basis of life, consists of these inorganic elements—oxygen, hydrogen, carbon, and nitrogen. He is also correct in stating that animals do not possess the power of forming protoplasm from those inorganic elements, while that power is possessed by the vegetable kingdom. It is also true, as he states, that a solution of carbonate of ammonia, or smelling-salts, contains in itself all the elements necessary for the formation of protoplasm; but certainly no animal could live upon a solution of smelling-salts. (Laughter.) No animal has the power of combining the inorganic elements which are found in the solution of smelling-salts into that material called protoplasm, which is the foundation of animal and vegetable existence; but plants do possess that power. A plant would grow in a solution of carbonate of ammonia, and would combine the protoplasm necessary for its development from the elements contained in that solution. But Professor Huxley then goes on to argue that the formation of protoplasm and the formation of organized beings from protoplasm is equally the result of natural forces as is the formation of water from its constituents, oxygen and hydrogen. He states the well-known fact that if oxygen and hydrogen gases are mixed together in certain proportions, and an electric spark is passed through them, an explosion takes place; and the only residue is a small quantity of water, exactly equivalent in weight to the gases which had previously existed. He goes on to say that by a certain reduction of temperature the water thus formed will become solid ice; and the gist of his argument is, that the formation of organized beings from the protoplasm—

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from the physical basis of life—is a precisely analogous proceeding to the formation of water from oxygen and hydrogen. He says :—

"Is the case in any way changed when carbonic acid, water, and ammonia disappear, and in their place, under the influence of pre-existing living protoplasm, an equivalent weight of the matter of life makes its appearance?"

Now here he is right so far, that no protoplasm is formed except under the influence of pre-existing protoplasm; but he omits here to state that that protoplasm must already be organized into a living being before it can possess the power of re-organizing or forming protoplasm from the inorganic materials of nature. Protoplasm, as such, cannot produce itself; and therefore Professor Huxley is here entirely wrong. It is not produced simply under the influence of pre-existing protoplasm, but under the influence of that protoplasm which has become constituted an organized being. Between the two there is a very great difference. The argument of the author is against the existence of what we call vitality; and he gives this illustration, as he supposes it to be, of his argument:—

"And why should 'vitality' hope for a better fate than the other 'itys' which have disappeared since Martinus Scriblerus accounted for the operation of the meat-jack, by its inherent 'meat-roasting quality,' and scorned the 'materialism' of those who explained the turning of the spit by a certain mechanism worked by the draught of the chimney?"

Now we shall soon see that that vitality is not so easily got rid of as Professor Huxley supposes. He says in one of the most important parts of his paper :—

"It may seem a small thing to admit that the dull vital actions of a fungus, or a foraminifer"—[one of the very lowest orders of beings]—"are the properties of their protoplasm, and are the direct results of the nature of the matter of which they are composed. But if, as I have endeavoured to prove to you, their protoplasm is essentially identical with, and most readily converted into, that of any animal, I can discover no logical halting-place between the admission that such is the case and the further concession that all vital action may, with equal propriety, be said to be the result of the molecular forces of the protoplasm which displays it."

Now I think I can help him to discover a logical halting-place which he does not seem to have observed. He begins that passage by observing :—

"It may seem a small thing to admit that the dull vital actions of a fungus, or a foraminifer, are the properties of their protoplasm, and are the direct results of the nature of the matter of which they are composed."

It may seem a very small thing to him, but it seems to me to be a very great thing, and to be just the root and gist of all the difference between materialism and immaterialism; and in this way :—A fungus is a plant of a very lowly organization, but it must be a fungus before it has the power of producing the protoplasm of which future fungi may consist. It must become a fungus before it has the power of assimilating and producing fresh proto-

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plasm. So long as it existed merely as protoplasm, it was destitute of that power, and it could not obtain that power before it was under the influence of a germ derived from a pre-existing fungus of the same kind. It is only under the influence of that germ that, finding suitable materials for the formation of protoplasm, it can convert and constitute that protoplasm by a succession of changes into the entire organism which we call a fungus. Then it is that, as a natural consequence, the fungus has not only the power of reproducing similar germs to those from which it itself arose, but it has also the power of producing protoplasm, and of combining together those inorganic elements into protoplasm which is to become the pabulum, the food, the building materials of another organism of the same kind. What Professor Huxley seems to look upon as a very small thing is really a very great one. It is the whole gist of the question, and it is not to be passed over or acceded to in that way. I will grant the Professor this much, that if we admit that the vital actions of the fungus are the direct results of the nature of the matter of which it is composed, we admit the whole question. But it is the same throughout the range of the whole animal creation. No piece of protoplasm has the power, simply as such, of reproducing protoplasm ; but when any piece of protoplasm is under the influence of a pre-existing germ whether animal or vegetable, that protoplasm is formed into an organized being, and that organized being is capable of producing other germs which will reproduce their kind and the protoplasm which will serve as material from which their after-existence is built up. Now, in following this out, we are inevitably led back to the great first cause. We get a succession of protoplasms so formed, but in each case it has only been under the influence of a being resulting from a germ which has proceeded from another germ of the same kind, and that from a former germ ; and so on. We are thus carried back, step by step, to the great first cause, who must have been the originator of all the individuals from which the germs were produced. That is an inevitable consequence, and therefore all the argument on the other side falls to the ground.—I can hardly pass over the contents of this lecture of Professor Huxley, without making one or two remarks, which I trust you will not consider irrelevant, on another passage. He says, towards the end of his lecture :—

"If a man asks me what the politics of the inhabitants of the moon are, and I reply that I do not know ; that neither I nor any one else have any means of knowing ; and that, under these circumstances, I decline to trouble myself about the subject at all, I do not think that he has any right to call me a sceptic. On the contrary, in replying thus, I conceive that I am simply honest and truthful, and show a proper regard for the economy of time. So, Hume's strong and subtle intellect takes up a great many problems about which we are naturally curious, and shows us that they are essentially questions of lunar politics, in their essence incapable of being answered, and, therefore, not worth the attention of men who have work to do in the world. And he thus ends one of his essays :—'If we take in hand any volume of divinity, or school metaphysics, for instance, let us ask : Does it contain any abstract reasoning concerning quantity or number ? No. Does it contain any experimental reasoning concerning matter-of-fact and

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existence? No. Commit it, then, to the flames, for it can contain nothing but sophistry and illusion.'"

Now, no doubt Hume was a man of great intellect; but this passage which is quoted by Professor Huxley, shows that he was a very bad logician. If any volume of divinity or metaphysics is to be rejected because it does not contain "abstract reasoning concerning quantity or number," or "experimental reasoning concerning matter-of-fact and existence," then, *à fortiori*, all books which do not contain these matters must be treated in the same manner. Take the histories of Julius Cæsar or of Napoleon Bonaparte; they do not contain any abstract reasoning concerning quantity or number, or experimental reasoning concerning matter-of-fact and existence, but they contain much important information. Or take any other history containing information concerning the past ages of the world. All these works must go into the fire, and lastly also, the Bible itself, containing the history of God's dealings with the world, as revealed to man by God Himself; and the life and doings of our Lord, as given to us in the New Testament. All these works contain no abstract reasoning concerning quantity or number, and no experimental reasoning concerning matter-of-fact and existence, and, therefore, they must at once be rejected. No doubt Hume wrote his celebrated History of England, as a matter of amusement and interest, but I would ask, according to his own view, why, when he had written it, did he not put it behind the fire? (Laughter.)——

Mr. REDDIE.—Is it certain that that quotation from Hume is given with exactness?

Mr. BROOKE.—Here is the quotation, which a foot-note declares is from Hume's essay "Of the Academical or Sceptical Philosophy," in the *Inquiry Concerning the Human Understanding*——

A MEMBER.—But does Hume refer it to works of history?

Mr. BROOKE.—Works of history must certainly be included within its scope——

A MEMBER.—But he says, "Any volume of divinity or school metaphysics."

Mr. BROOKE.—But if the argument is worth anything, it must apply to other books as well. If any volume of divinity or school metaphysics is to be rejected because it does not contain any abstract reasoning concerning quantity or number, or any experimental reasoning concerning matter-of-fact or existence, all other books which come under the same category must also be rejected for the same reason; that is the only logical conclusion: it is a universal logical consequence——

The CHAIRMAN.—And that is the use which Professor Huxley makes of the passage, or else it would be irrelevant.

Mr. BROOKE.—Quite so; that is why it is introduced here, and it is clear that the logic is exceedingly bad. Professor Huxley goes on to say, "Permit me to enforce this most wise advice." Now I have a very great respect for the talents of Professor Huxley, but I should have been very sorry to have

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imputed to him an accordance with such a miserable piece of logic as that which I have just read. Now in this lecture which I have been commenting upon, he is quite correct upon some points; and that is what is calculated to mislead the intelligence of others upon other points. He is quite correct in saying that protoplasm is produced only under the influence of living protoplasm, but he makes no allusion to the indispensable influence of the pre-existing germ or organism of the living being. He makes no allusion to that necessary antecedent; it would not suit the gist of his argument.

Rev. J. MANNERS.—I should like to say a word or two with regard to Professor Huxley's theory. I should like to give him this simple equation to solve: let him take C H O N—call them definite, indefinite, or variable quantities, or what you like,—and from these quantities let him find me ζωή, or life. Let him do it as a sort of algebraic problem: given four unknown quantities to find a known positive quantity. Let him have C H O and N, or protoplasm, and from that let him tell us what is life. We know that carbon, hydrogen, oxygen, and nitrogen form various combinations; but how do they form what you call protoplasm? Where did you get that name from? Why do you introduce it? You tell me it is the basis of life—the basis or foundation of life. But I must first know what you mean by "foundation"; we must have no mistake about our words; and then I must know what you mean by "life." I say that all these arguments seem to me, after all, to involve the great truth which they appear to deny. But let us come back to this most interesting paper of Mr. Wheatley's. The term "life" we know requires an adjective to qualify it in order to give us a proper idea of what we mean by it; but at the same time the word itself lies very deep, deeper far than any mere matter of history, or any mere matter of form, or of materialism. It seems to me that the origin of life must *be* life, whether in the beautiful forms of the vegetable world or of the animal kingdom. The origin of intelligence, the origin of the will, the origin of thought, the origin of desire, the origin of love,—all these must be anterior to that which is the manifestation of these various principles; and therefore we come at once, as a matter of sound, common, inductive reasoning, to the conclusion that the origin of all these principles which we find manifested in creation must be life. In inorganic matter, when we wish to resolve it into its primitive elements, the chemist comes in to our assistance. He takes a drop of water, for instance, and he says, "I find it is composed of oxygen and hydrogen"; and if he takes these elements, and passes an electrical spark through them, he immediately obtains water. But when we have got so far, I want to know the cause of all this. I want the cause of this living, essential, vital, wonderful, and beautiful power, which has not only brought these things about, but which preserves them, and gives them their beauty and form in their present manifestation. It seems to me, therefore, that all true science must have its basis, not in what is commonly called inorganic or dead, insensible materialism; the cause for all these things must be found in the spiritual and eternal. There will be no advance in true science; there can be no real

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cause assigned for anything until we come to the spiritual—to the Word that said, "Let there be light, and there was light."

Dr. ORD.—It seems to me that this lecture of Professor Huxley's is rather usurping the place of the paper which we came here to listen to, but quite unavoidably; for Mr. Wheatley's paper, having been written some months ago, naturally could not take cognizance of Professor Huxley's important lecture, and no one can wonder that Professor Huxley's lecture should have set men thinking. For myself, a young student of physical science, I feel that if I accept Professor Huxley's paper, I am placed in a very unhappy position. If I reduce myself to a mass of matter, I can only hope to live and have intelligence so long as that matter continues living. It seems the logical conclusion of the lecture, that all our aspirations and thoughts—all that we usually attribute to the soul—are bound up in matter, and can only exist so long as that matter exists in the form of protoplasm. On that subject I think both Mr. Wheatley's paper and Mr. Brooke's remarks have hit the point involved. Professor Huxley, in his paper, has said nothing of the origin of life: he has simply brought us to the point, that we are made up of what he calls protoplasm. He takes us down to the simplest form, that of the foraminifer—a mere mass of matter of the lowest organic type, and points out that it has certain properties associated with a certain quaternary chemical constitution, of carbon, hydrogen, oxygen, and nitrogen, properties usually called vital, but which the Professor assumes to be merely the reactions of protoplasm. But he has not told us that protoplasm is formed without the intervention of pre-existing living organism, and that I take to be the weak point of his paper. I wonder that he has said nothing of the theory of spontaneous generation, which is now being again put forward here and on the Continent. Some people think that the advocates of that theory—MM. Pennetier and Pouchet—have the advantage; but the more I read of it, the more I am confirmed in the belief that spontaneous generation never occurs. Another weak point in the argument is, that we have no indication whatever of the way in which these different masses of protoplasm—in the corpuscles of the blood, for instance—are enabled to act in concert, so as to keep the whole body going. How protoplasm is to work in that way, I confess I cannot understand. We are told that everything must be rejected as unworthy of notice which cannot be subjected to demonstration, or has not predicables of number, or shape, &c. We are to believe only in what we can comprehend and master. But I think we may, even from aspects of our own consciousness, show that there are things which we know to exist, and yet which we cannot comprehend. One of the earliest puzzles to me when I began to think, and before I knew that the world was round, was—where it ended. I used to wonder where I should find the end, and what was beyond. So it is now with regard to the infinity of time and space—the same feeling comes over me. I know the thing must exist, but I cannot conceive it, and I feel an awe before it like that which I feel when I think of my Creator. It is the same with regard to our existence. We must add a great deal to what Professor Huxley has said before we can have done with this question.

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Accepting his arguments in other papers, we must acknowledge that man and some of the highest order of animals are organized in the same way, and are made of the same material. If we compare man and some of the higher apes, we shall find no difference between them organically; and yet, what an immense difference we shall find in their endowments! I do not think any one has ever attributed to the animal the possession or consciousness of any sort of abstract thoughts or ideas. I have never seen any indication that an animal has been found to have any sense of absolute right or wrong, or idea of geometrical abstractions or abstract beauty. I cannot imagine a dog or an ape admiring scenery, and, although they have tongues like our own, you never find these tongues used for the purpose of articulate language. Articulate speech may be mocked by animals, as in the case of parrots, but it is never used by animals themselves in communication with one another. Such language as animals do possess is always the same for all times and all purposes. Cocks crow and dogs bark now just as they did when they came out of the Ark; but man, even in the lowest stages of barbarism, forms a language suitable to his own purposes, and always changing. Professor Max Müller tells us that where there are no written documents to keep language together,—as among some of the tribes of Africa, for instance—language changes its form in twenty years. Words which are, as it were, the slang phrases of one generation become embodied in the ordinary language of the next, and take the place of other words which had been used before. This changeable articulate speech, and these powers of perceiving moral ideas and abstract truths, constitute, to my mind, differences as great as any of the structural or chemical differences by which great groups of animals are separated from one another. I cannot help believing, therefore, that there is some higher faculty implanted in man than you find in the lower animals, and I cannot understand how mere protoplasm, without some higher power, should have made all that difference. With regard to Mr. Wheatley's paper, there are so many interesting remarks in it, so many glimpses of truth, that one feels disinclined to say anything hard of it; but the way some of the questions of fact have been handled by the author illustrates the danger of people taking up subjects like this without the fullest information. In several instances Mr. Wheatley should have learnt a little more of what I may call the grammar of the subject; but it would be unkind to say more than that, inasmuch as our Vice-President (Mr. Brooke) has drawn attention to one of the most glaring instances of that kind.

The Chairman.—As no one seems willing to continue the discussion, I will now bring it to a close. The last time I was here I said so much on this subject that I hardly know how I can supplement it now, although I know it is one which is capable of the widest discussion. I think a great deal of obscurity arises in these matters from the necessary imperfection of the words we use. For instance, the whole of this discussion has had relation to the existence of a certain matter called vitality, as opposed to inorganic forces. It is admitted that the particles of matter composing the

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inorganic world have certain forces bound up with them ; but the question is, whether that which we call vitality is a different force bound up in us, and which we cannot obtain from that which is not vital. The question is whether there is any difference whatever between the organic and the inorganic world. If we take the views of Professor Huxley and Dr. Odling on life, we are bound to maintain that there is no such thing as life at all, for vitality and life express the same thing, and that therefore it is altogether absurd to make the distinction between organic and inorganic bodies ; that an organic body is that which possesses life, while an inorganic body is that which does not. We are told that the life in an inorganic body is nothing but the action of inorganic forces. But still a great deal of the effect of which I have spoken lies inherently in the ideas which we have of force ; and here I must say that I venture very humbly to differ from Mr. Brooke in his illustration of force. I know it is the popular illustration which is given by many in the present day, and which is considered philosophical ; but when we use words in natural philosophy, before we can apply them to the purposes of mathematical demonstration, we have to give them a strictly defined meaning. Now I complain that the illustration drawn from the action of the cannon-ball and the gunpowder—that the gunpowder possesses force, and that the cannon-ball does not—differs altogether from the definition of force in natural philosophy. The old-fashioned definition of force was, whatever was capable of producing or had a tendency to produce motion in matter was force. The thing moved was matter ; the thing that moved it was force ; and there were as many different forces in nature as there were kinds of matter. We know there are several different forms of matter, which chemists can analyze in detail, and dissociate and combine, and that which combines or unites these things we call force, because it moves those material particles and re-arranges them. The force is that which moves the particles of matter and arranges them anew. There are two things in nature which present themselves to our analytical investigation, two distinct bodies, the one called inorganic or dead bodies, and the other a different series of bodies, called living bodies. Now is there any distinction between a living and a dead body ? Here we may enlarge our terms, and force may mean power. Sometimes you may have something which you cannot exactly call force, but which is power, and I will give you an illustration of this to make it clear. I differ in regard to the illustration of the cannon-ball, because when the ball leaves the gun and goes against a hard body, it does produce motion, and I do not call that energy, I call it force. It may be convenient to introduce a new term, but do not let us confound that with our old definition, force. I have seen a wonderful piece of machinery which was invented by a man named Schutz, and which is now in Somerset House—a calculating machine. No doubt its originator, though not actually its parent, is the celebrated Mr. Babbage. This machine was made by a man who was only aware that Mr. Babbage was engaged in making a machine that should calculate logarithms and different things that required extensive powers of calculation, and which should do what the human brain could not do—go on

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making calculations without tiring; and not only that, but this machine supersedes the work of the compositor and corrector for the press, by impressing its calculations, when made, upon paper in such a manner that they appear printed. If you go to Somerset House, and put in certain figures and make certain arrangements with the machinery, you can make the machine turn out square numbers or cube numbers, or fourth powers, or sixth powers. I can do all that by putting in for the square numbers two or three figures, for cube numbers a few more, and so on, and I can produce all the results I want by the turn of a handle. At the same time I put in a piece of soft paper, and that soft paper comes out impressed with the figures 1, 2, 3, 4, and opposite these figures as they appear I get the squares or cubes of these numbers as I want them. Well, now, what is there if I examine the machine? What force is acting there? There is simply the force of my arm turning a handle, which then puts a series of wheels in motion, and the effect of that force is to produce the complicated calculation of which I have spoken. But is that force,—which I could employ by means of a steam engine instead of my arm, or by simply letting a weight fall to the ground—I want to know, is that force the source of the calculating power of that machine? I say that to call that mechanical force which turns that wheel the calculating power of the machine would be to fall into the very error which is contained in the paragraph quoted by Mr. Wheatley from Dr. Odling as to the power of cosmical force :—

"That all actions of the animal body are traceable to cosmical force; that in living, as in dead matter, there is no creation of force; and that any explanation of the phenomena of life which recognizes the agency of vital force is simply no explanation at all."

And he goes on to trace the whole of that force to solar force. According to Dr. Odling, all my life and all my thought are only manifestations of solar force; while, according to Professor Huxley, all my mind, all my thought, all my power of calculating and power of action, are simply the result of protoplasm, acted upon by the combinations and combining powers of C H O and N. When I come to animal chemistry, I find the operation of the problem: I find that C H O and N are capable of giving us an infinite series of combinations, and may have almost any numbers and almost any powers applied to them. Now when I go as a thinking being to that calculating machine, I should consider the man unphilosophical and absurd who told me that the calculating power consisted simply in the inorganic force or the organic force which caused the handle to revolve. Am I to suppose that so much mutton or beef eaten by me, and converted into so much protoplasm, has produced that thought and calculation? I will take a man to turn the handle who is quite incapable of ascertaining a square or a cube, and another man, who never heard of logarithms, shall put in the figures, and still the machine shall turn you out any number of logarithms, squares, and cubes. Or suppose I take so much water, and so much fuel, and produce so much steam to do the work for me—

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will any one tell me that that steam is the calculating power of the machine? The man who made the machine says he derived the idea from hearing that Mr. Babbage was making one like it. But what did that man possess? He possessed wonderful powers of calculation; but, more than that, he also possessed mechanical genius: he possessed the knowledge and power which were necessary to enable him properly to combine and arrange all the different materials for his machine. And now I will tell you a very curious thing with regard to that machine. The godfather of that machine, who was most concerned in its manufacture, told me that he asked one of the most distinguished mathematicians of our day—one of the best calculators in the country—to go and see the machine, but he replied: "It is perfectly useless for me to see it, for I should not be able to comprehend it at all. I should see nothing but so many wheels, and iron and steel bars, and so on; and they would give me no notion at all, because I cannot understand mechanical combinations." One of the first machines of that kind which was ever constructed went to Paris, and was exhibited there; and Professor Babbage said that none of the Frenchmen comprehended it, and that he got it a gold medal simply on his statement, that it was sound and good, and would do its work properly. The Frenchmen said: "Well, you understand it; and upon your testimony we will give it a gold medal. It is a most wonderful thing; and you can make it turn out millions and millions of square roots and logarithms, and other calculations. It is a great work of human intellect; and no one could have made it without exerting the power of human intellect to cause all those dead particles of brass, and copper, and zinc, and wood, to be so arranged as to produce certain arithmetical combinations." But all these materials would be totally useless unless you had a skilled hand to direct it, and to know what figures are to be placed in it to produce those results. Now we find the same difference between the organic and inorganic bodies with which we deal. I grant that if you investigate the matter, the laws which regulate the inorganic world are quite as marvellous, quite as incomprehensible, and go as far beyond man's limited powers of reason and understanding, as the laws of the organic world. The laws and arrangements of the one are as marvellous and as incomprehensible as the laws and arrangements of the other. But there are marked distinctions between them, which are perfectly comprehensible to mind, reason, and intellect, and perfectly conformable to true scientific induction and scientific analysis. Let me take a hen's egg. You have there a most marvellous structure: you have first a marvellous outside casing of carbonate of lime, not arranged according to the forms of crystallography, in which the particles of carbonate of lime would fall if allowed to arrange themselves, but built up and arranged in as wonderful a manner as the bricks and stones which form the dome of any great building, just as you see in such a wonderful structure of human intellect as Westminster Abbey or St. Paul's Cathedral. But, passing by the shell, you find that that wonderful case contains within it as good an example of pure protoplasm as any of the substances which Professor Huxley has called our attention to. When we come to analyze it, we find not

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only the carbon, hydrogen, oxygen, and nitrogen, but we find it contains lime, ready to make the bones of the future chicken. The white and the yolk of the egg contain within them every material constituent and ingredient which goes to form the material body of the future chicken. If we wish the chicken to be formed, we have only, by a well-known law of science relating to the inorganic elements, to apply a sufficient amount of heat in order to hatch the egg. It may be solar heat, or heat from combustion, or even heat from the human body; for I know an invalid lady who has lately herself been hatching eggs for her husband's scientific pursuits. (Laughter.) The heat evolves the chicken, but does that heat produce the chicken? Is the heat in any way the producer of the chicken? I say emphatically, no. You might just as well say that the mechanical force used in turning the handle was the power of making the calculation in the calculating machine. But I will go further. It may be said, "Yes, your argument suits us very well. Your machine contains nothing else but inorganic particles, and nothing but inorganic force is required to act upon it. All we would say is, that the egg contains certain combinations so beautifully arranged that they will go on working until they evolve a chicken, in a manner similar to the working of the arrangements which you have made in your machine." Well, I should not quarrel with you so much if that were your view, but what is the object of Professor Huxley and Dr. Odling? Their object is to eliminate all idea of design—to eliminate in some way or another all idea of a Creator. You find that lying at the bottom of their views. That is why we put on our "theological war paint," and protest against such views, and inquire whether they are scientific or not. Now, truly scientific men cannot be but observers of the facts of nature. Now we learn by observation that certain forces, called inorganic forces, and belonging to the inorganic world, are capable of producing certain results. We find, however, that they are comparatively limited in their action, and we can never get them to combine so as to produce a living soul. Professor Huxley has never grappled with that point; Mr. Darwin even did not venture to go with his theory further than to that moment when life was furnished by the Creator. Supposing we go with Darwin, why are we to limit the Creator's power of furnishing that life to one single monad? But let us go back to our egg. I find that that egg has certain powers as a living egg which distinguish it from a dead one. Place it in a freezing mixture, and if it is alive it will resist an amount of cold that a dead egg cannot resist. That is a fact of nature—a fact brought forward originally, I believe, by John Hunter, and confirmed by Mr. Paget in a paper read before the Royal Society. There is a power in the living egg of resisting cold which distinguishes it from the dead egg. If you increase the temperature in an incubator, you can destroy the life in the egg as surely as by increasing the coldness in the freezing mixture beyond the point which life can stand. We know, as a fact, that living matter can withstand degrees of cold that dead matter cannot withstand, and in the same way it can withstand degrees of heat which dead bodies cannot sustain. That was proved by the celebrated

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experiments undertaken by John Hunter, when he went into an oven heated to such a degree as to fry a piece of beef placed in with him, and which he and his friends afterwards ate. That dead matter consisted, like himself, of protoplasm, but that experiment showed the difference between living and dead protoplasm. But when we come to the structure of our chicken, we find it is a most marvellous structure. We find much more wonderful things in it than in our calculating machine. We find it has an eye, a heart, a skeleton; and that the heart is placed in connection with the arteries, and circulates the blood throughout the system. All those things are formed with a knowledge of the laws of mechanics, of hydrostatics, and of optics, which it takes all man's wisdom imperfectly to find out. Now, I want to know whether all that comes out of the inorganic dead matter, or whether we must refer it to some other power, not even produced by the power of vitality, for vitality is of but little account in doing that. We must at last confess, with Newton, that the eye was not formed without skill in optics; and I do not believe that that skill is contained in innumerable particles of carbon, hydrogen, oxygen, and nitrogen, or that those things can produce such a marvellous piece of mechanism as my eye or the eye of a chicken. But, supposing all this is admitted, and that you say that any amount of protoplasm has in itself the power of reproducing its own species. You have yet to come to the marvellous fact that there are certain beings in the world which require the conjunction of two agents for the production of their species; while there are others which evolve their kind from themselves without such co-operation. Why does not the egg evolve chickens without this aid, when the acorn has in itself the power of producing an unlimited number of forests of oak trees? We find, as a scientific fact, that there is something—you may call it force or what you like—that there is a power of structural formation possessed by organic bodies which you do not find existing in inorganic bodies. Nowhere yet have we perceived in nature any instance in which the inorganic world has been able to acquire that power without coming in contact with that power previously existing. We may go back for an almost infinite series, but we must come to the time when that power was first given, and then the Bible reveals to us one great fact, not only that there is a Creator of all things but a Sustainer of all things. The modern so-called philosophy, which is endeavouring as far as it can to ignore the Creator, to push Him farther back, and to hide from us the knowledge of the wisdom which we can read in His works; that same philosophy is totally and entirely ignorant of this; that all these things require not only an Almighty Creator, but an Almighty Sustainer; and the Bible shows us how all these things are perpetually under the eye of the Heavenly Father. Two sparrows may be sold for a farthing, but not one of them can fall to the ground without His knowledge. That is told to me as a proof of that Heavenly Father's power and care and love for me; and I protest against this so-called philosophy not only as unsound, not only as unscientific, as I most thoroughly believe it to be, but also as ungodly, denying God's sustaining power, and it would also deny, if it could, His creating power. That is the reason why we

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have put on our theological war-paint in order to fight these scientific gentlemen step by step, to meet their arguments by our arguments ; and to show them that there is not in their views—at least so far as the views of Dr. Odling and Professor Huxley are concerned—that there is not one single fact brought forward to prove that there is no such thing as life, or that there is not a power in organic nature which is not to be found in inorganic nature. Man has the greatest manifestation of God's power in his own body—manifestations which altogether transcend his intellect. No man could make his own eye, or his own heart, or his own nervous system. The whole of the vital actions of man's body depend on a higher wisdom than he possesses. But man has something else totally and entirely distinct from all this vital power and force. This vital power and force he possesses in common with the plant and with the animal. But his higher mental powers and reason are totally and entirely distinct from his vital powers, though they may be bound up with them ; and they have been given to him by his Creator, as the sign and mark of his having been created in the image of that Creator. (Applause.)

Mr. Brooke.—May I be allowed to say one word to supplement our Chairman's excellent illustration of the egg as an evidence of the existence of vitality ? There is, on the surface of the yolk of the egg, a small microscopic speck, which is really the germinating spot from which the future chicken is evolved. Now, if you could only remove that speck from the egg, the egg might be sat upon until Doomsday, but it would never produce a chicken. There is a mass of protoplasm still left for the nourishment of the chicken during development, and that mass of protoplasm, if we eat it ourselves, will be assimilated by us and enter into our composition ; but to produce a chicken, it is necessary that the little germinal spot should be there. That is the seat of vitality ; and by vitality we mean the power of originating life, and generating a living organism out of the proper and convenient materials. In the same way, take a walnut, and plant in the earth under favourable circumstances, and a walnut-tree will spring from it. But if you remove from one end of the walnut a little particle of protoplasm which you find lying there, and which is the vital germ, if you make a little hole and scoop that out, you may then plant the walnut, but you will never get a walnut-tree from it. The vitality is not distributed indiscriminately over the whole walnut ; it is in that one little particle ; and if that particle be removed, there is no longer any power in the nut to reproduce its kind. The vitality is in that one little germ, and if that germ be removed, the mass of protoplasm which is left is incapable of producing its kind. That protoplasm is only capable of nourishing the little germ during the early period of existence, or of nourishing ourselves, if we eat it. Vitality does not exist in the mass of protoplasm, but only in the germ. (Hear, hear.)

The Chairman.—Let me supplement this again. When we refer to this little germ, let us see what modern hypothesis would have us conceive as existing in it. Let us apply it to that little germ of the egg. The pangenesis theory of Mr. Darwin would have us believe that there exist in that minute

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germ of the egg myriads of gemmules derived from all the parents and predecessors—the grandfathers and great grandfathers of that egg. There are gemmules in that speck capable of producing every part of the eye; for instance, a gemmule for the transparent cornea, another for the opaque cornea, another for the sensitive iris, and so on. All the mechanism and all the geometrical appliances of the eye must also have their respective gemmules, capable of reproducing gemmules of their own, and all having come down from 50, 100, or 200 predecessors. Let us suppose that a man has a great variety of pigeons, separated into fantails, pouters, &c., and capable of reproducing the blue rock pigeon with its peculiar feathering. To ask me to stretch my faith into the existence of all these marvellous gemmules, is to require from me at least as great an amount of faith as to believe that all have been produced and sustained by one Almighty Creator.

The Meeting was then adjourned.

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ORDINARY MEETING, April 19, 1869.

The Rev. W. Mitchell, M.A., Vice-President, in the Chair.

The Minutes of last Meeting were read and confirmed, and the following election announced :—

Second-class Associate :—Robert O. Turnbull, Esq., Bishop Auckland.

Professor Macdonald then read the following paper :—

ON MAN'S PLACE IN CREATION; GEOLOGICALLY, CHRONOLOGICALLY, ZOOLOGICALLY, ETHNOLOGICALLY, AND HISTORICALLY CONSIDERED.

By W. Macdonald, Esq., M.D., F.R.S.E., &c., *Professor of Civil and Natural History in the University of St. Andrew's.*

THE Duke of Argyll, in a small volume just published, "On Primeval Man," which had already appeared in *Good Words*, gives an able analysis of the views on this subject held by the late distinguished Archbishop of Dublin, Dr. Whately, the great logician ; contrasting with them the opinions which Sir John Lubbock expressed at the meeting of the British Association, at Dundee, in 1867. The Duke subsequently, however, submits his own views upon this subject.

The Archbishop maintains that mere savages, in the lowest degree, or even in anything approaching to the lowest degree, of barbarism, in which they can possibly subsist at all, never did and never can, unaided, raise themselves into a higher condition ; and even when in contact with superior races it is extremely difficult to teach them the simplest arts ; they never invent or discover anything beyond what is absolutely necessary to keep them alive, on the barest subsistence. Even necessity, the mother of invention in races having some degree of thoughtfulness and intelligence, produces no effect on these low savages. Whatever the natural powers of the human mind may be, some instruction from without is required

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to prepare even for a start. The Archbishop holds it to be a complete moral certainty, that men in a state of nature, with the faculties born with them neither unfolded nor exercised by education, never did, and never can, raise themselves from that condition. Therefore, according to the present course of events, the first introducer of civilization among savages must have been in a more improved state. In the beginning of the human race there could be no man to effect this; therefore it must have been the work of another being; in short, there must have been something of a revelation to the first or early generation of man. The soundest conclusion is that a Divine Creator and Instructor had effected this necessity.

I think there is great logical acumen and soundness in this view by the great logician, which will be more fully noticed in the sequel.

Sir John Lubbock undertook to refute this argument by concluding that the *primitive condition of man was one of utter barbarism*, from which certain races have, independently, raised themselves; and that instead of existing savages being the degenerated descendants of more advanced ancestors, all the races now civilized arose from those that were in a state of barbarism. A further conclusion is indicated that the first man, "worthy to be called a Man, was in advance of the condition of some *animal progenitor*"; evidently tending to the gorilla speculation of Professor Huxley. This is an expression which I think to be unworthy of the subject, or of the high and distinguished position in science which Sir John Lubbock holds. He pursues the argument by the two following propositions, which he undertakes to prove :—

I. "That there are indications of progress, even among savages;" and

II. "That among the most civilized nations there are traces of original barbarism."

The Duke of Argyll has long had an impression that Whately's argument, though strong in some points, is at others open to assault, and that the whole subject requires to be handled from a different point of view. On the other hand, that the argument in favour of the "savage theory" is the weaker of the two, resting on a method more inadequate and incomplete. He proposes to set forth the reasoning on which his convictions rest, after noticing some preliminaries.

Both the Archbishop and Sir John Lubbock advance arguments which are purely scientific, founded on natural knowledge, using only as evidence of truth such facts and inferences as are ascertainable by pure reason, avowedly conducted irrespective of any support from the Mosaic account of

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Creation. Whately expressly says that in his argument he has not appealed to the Book of Genesis as an authority, as he thought it important to show, from what was actually before our eyes, viz., *the existence of civilized man*, quite independent of, and superadded to, the conclusions of the Bible narrative, from which there is no escaping.

The opposite argument, of course, starts also from the basis of scientific independence, without professing or caring to reconcile the conclusions of the Bible narrative. Sir John Lubbock says emphatically, at the close of his paper, "These views follow, I think, from strictly scientific considerations." If the inquiry is to be pursued at all on the scientific basis, it must be conducted rigidly and honestly, and only those conclusions legitimately accepted which are justified and supported by the nature of the data, and the reasoning employed.

The question upon such a speculative subject is often shirked, from the apprehension that it transcends our faculties to ascertain the truth. The timidity of this confession ought to receive but one answer, viz., that the explanation of a question which ought to be understood by all, so far as our mentality permits, when prosecuted with the simple and humble desire for truth, is for our own benefit and that of our brethren of mankind.

When the Archbishop of Dublin entered on this discussion, declaring that, independently of all Bible authority, certain conclusions can be shown to be unavoidable by natural reason, we cannot prohibit others from entering upon the same ground and producing such arguments as enable them to support an opposite conclusion. This shows that the subject must be encountered as a matter of necessity, though some tender consciences may deplore this, if only on the ground that the thirst for knowledge may be carried to excess when mere idle and vicious curiosity impels it. But surely, when directed to the higher pursuit of intellect and science, it may not only be permitted, but is praiseworthy; as David says: "Lord, my heart is not haughty, nor mine eyes lofty: neither do I exercise myself in great matters, or in things too high for me." (Ps. cxxxi. 1.)

On the other hand, it must be admitted that nowhere are human speculations more liable to the delusions of superstition than in the conception of subjects of this nature, leading to ideas which are forbidden to investigation, did we not observe the cautious restriction proposed by Baron Bünsen, "That all speculations, however lofty or obscure, should be subject to the strict dictates of common sense." It is well known that many of the wildest fancies of our generation have

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attempted to reach bounds beyond the limits of our minds to analyze, and that such early dreams, accounted as vain fancies by some, have been received as true and adopted as facts by the succeeding generation, ever subject, however, to change by the progress or diffusion of knowledge.

The physical laws of nature,—now so familiar even to school-boys, that the law of gravitation which immortalized the name of Newton is now so universally understood that he that runs may read, and is regularly explained in every popular assembly in small towns throughout the country,—were held by the early Greek philosophers as restricted to the profoundest secrets of God, which were beyond their scope; while they preferred to engage themselves in studying the phenomena of their own mentality as more comprehensible by their understanding. Thus they plunged at once into all the many refinements of metaphysics, from which it is devoutly to be wished that the human mind might at no very distant date be slightly relieved by its becoming more amenable to the dictates of common sense.

The pursuit of speculations was at first carried on by the restless thirst for knowledge as to the nature of matter and its constituent properties; the time of man's first appearance on the globe; his primary condition; his distribution; the localities where he rose from; and the generations which followed him, approximating the utmost limits of our powers to analyze. Still, the mere appearance of the limit need not deter us, because we well know that "whatever is inaccessible to reason is strictly interdicted to research," as Mr. Lewes says. This is reproducing the old priestcraft interdicts, determining what is *inaccessible to reason*. The priests of this new philosophy tell us, if all proofs of mind are to be received as evidences of purpose and conceptions of plan and design in the history of creation, it merely indicates the product of the weakness of human intellect.

In spite of all these attempts arbitrarily to restrict the bounds of knowledge, we can never really know its limit until the way of access has been fairly tried. The interests of truth demand the resistance of any interdict against research, whatever school may have presumed to raise it, evidently from feeling a dread of free inquiry. On these principles such subjects are accessible to research as the age of man's appearance and his condition during the pre-Sabbatic period, as well as the contemporary history since the creation of Adam and Eve in Paradise, the "*ish*" and "*isha*" indicating the spiritual form in which they were at first created, prior to the events recorded in the third chapter of Genesis, where

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they submitted to the premonished condition which resulted from partaking of the fruit of the tree of the knowledge of good and evil, by which they instantly saw that they were naked *in the flesh;* evidently the real purpose of their creation in the garden of Eden, in order to become the true source of the peculiar people of God. The events of this chapter have been generally believed to be the transgression and not the fulfilment of a conditional law, which resulted in their expulsion from Eden; and the few following chapters refer to the history of his family and descendants, among some of the earlier races of mankind, previously created during the sixth geological or pre-Sabbatic period (Gen. i. 27, and following verses).

I have long held these opinions, and am every day more and more convinced of their substantial truth. If churchmen were more freely and firmly to examine and expound the first chapter of Genesis with a sufficient knowledge of physical laws, they would not permit the materialists declaring it to be a myth from its being opposed to hazy myths of their own fanciful imaginations. I also consider that the idea of the savage origin of mankind is not applicable to all races as regards the definition of Sir John Lubbock, when he speaks of "the first being worthy to be called a man"; intimating that he was developed from some pre-existing creature not worthy to be so called, with evident allusion to the Gorilla theory of Professor Huxley.

However boldly the Archbishop and Sir John, as well as the Duke of Argyll, may restrict their investigations to the mere demonstrations of science, not necessarily unheeding the mysterious declarations of Scripture, from which the Archbishop admits there is no escaping; the facts remain, however, unheeded; even the more sceptical are tolerably familiar with them when they attempt to avoid them as intruding in their paths of speculation.

One thing which, as much as anything, has tended to confuse the subject of man's antiquity and his first appearance on the stage, is the restriction of his race to the Edenic source, from the Sabbatic Adam and Eve, and the unity of the human race. And so strongly prejudiced is the Duke of Argyll "on the unity of the human race, in respect of origin," that, he says, "it is not easily separated from some principles of high value, enabling us to understand moral duty and religious truth. And precisely in proportion to our value of the belief in the unity of the race, we should be willing to accept the evidence of man's antiquity. The older the human family can be proved to be, the more possible and probable it is that it had descended

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from a single pair." He then expresses his firm belief that all science supports this conclusion, which tends to establish the antiquity of man on a firmer basis. He then resolves his examination of the subject into three divisions for its full exhaustion, which, though connected, may be treated separately as three subjects :—

I. The origin of man, considered chiefly as a species, as regards his creation and his admission into the world.

II. The antiquity of man, or his time in the geological history and preparation of the earth for his appearance on the globe.

III. His mental and moral culture.

Evidently dissatisfied with the utter barbarism proposed by Sir John Lubbock, as the condition of "the first man, worthy of being so called," as well as the inuendo referring to the gorilla or some other creature not worthy to be so called, he clearly points out "that utter barbarism is by no means a necessary consequence of all the races of mankind, however, whenever, or wherever originating"; but that the first communicated knowledge, and the special powers of acquiring knowledge and the other powers of usefulness, were inseparably connected with the created organization "which made him worthy of being called man."

As a person from this country intending to emigrate to a distant colony, naturally examines a gazetteer or geographical account, to obtain some information as to the proposed land of his adoption; or, as a student of English history, without lingering on the period of the Conquest (as the Duke and others do on the Pair of Eden), anxiously inquires who our British ancestors were, under the guidance of Lysons; so I boldly press into the dawn of Bible history, sure to find there the very earliest record of events, with the order of their progressive course marked with clearness. Without resting merely on the data afforded by the inspired record, I search the works of the same all-pervading creative force, and there step by step, in the same regularity, the finger of God, as on Sinai, has affixed His testimony on the solid masses of the earth's crust; proving the reciprocal accordance of the Word and the Work. Had the Duke commenced with his second division—the geological—he would have been able to trace mankind and its various races much anterior to the Edenic Adam.

It is with the object of tracing out the first glimpses of man that I begin with the first chapter of Genesis, as containing a succinct though brief account of the events of the first Creative Week or Period, throughout which each day is

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marked with one or more of the characteristic plants or animals that have been named.

Adopting as my chart the Bible, which is believed to contain the full evidence of truth, I propose the following as the order of treatment:—

I. Man's time and place in geological history.

II. His origin as a zoological species; and the method of his creation.

III. His mental state and condition when first created.

The first two of these divisions may be considered as introductory to the main subject, and should be well understood and possessed by all, previously to taking up the inquiry. They will thus be well prepared for deciding on the When and the How, as well as on the Where and the Why, to be treated of in the present communication.

These preliminaries being settled, I now begin by stating my ideas upon the origin and antiquity of man, referring to Gen. i. 23, where we are told that the evening and the morning concluded the fifth day.

The next verse details the creation of living creatures, cattle, creeping things, and beasts. In ver. 27 we read that God created man in His own image and after His likeness, with dominion over the fish of the sea, fowls of the air, and over all the earth. God created man in His own image, "male and female created He them." It is particularly necessary to retain distinct ideas conveyed by the expressions in the text, in order to contrast it by-and-by with those views subsequently detailed in the creation of the Sabbatic Adam.

Starting with the earliest or pre-Sabbatic chronology, the first few stages recording the creation of plants and lower animals, the detail of scattered events of the first five days may be passed over as concluded by the evening and morning of the fifth day, in order to arrive at that period when mankind—male and female—were created by the will of the Triune Heavenly Council, in the image and likeness of Elohim, or the Word who created all things.

The first events of the sixth day were the creation of living creatures, cattle, and creeping things, and beasts. During this sixth very eventful period of man's creation, I feel strongly impelled to place the creation of all the various races of mankind, with constitutions fitted and well adapted to pass their lives in the different regions and climates in their best and happiest state, increasing and multiplying, replenishing and

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subduing the earth according to their varied capacities. All these different races may be supposed to have been created at subsequent stages in the sixth geological epoch of the earth-crust, on the same zoological principle as shown in the accompanying zoological table, beginning with the less-developed species.* It is generally maintained that Man is a single species; in fact, a single order, family, genus, and species, subject only to varieties or races. M. Virey and some other naturalists considered Man as two species; however, the more elevated estimate of mankind in relation to the animal scale is now beginning to be entertained, by raising him to a higher rank above the vertebralia, as the class of Spiritualia, "a little lower than the angels of heaven." Man, thus being separated from the lower animals, has an internal structure constructed on a similar principle. Like them, he is vertebrated, segmented, and generated in the same manner, being developed from an impregnated germ in an ovule included and fully developed within his maternal parent.

The very important doctrine of "unity of organization" is beautifully supported by this view of man's construction, though separated by spiritual mentality above the "beasts that perish," supporting the view that one type of organization evidently demonstrates one primitive creative force. On this principle we can recognize the gradual perfecting from the different races of mankind through seven distinct classes, up to the period detailed in Genesis i. 26, 27. When the determination of the Divine Triune Council decided "to make man after their image and in their likeness," mankind, male and female, were in consequence so created, "to increase and multiply, replenish the earth and subdue it." From what is known of the progress of mankind in regard to civilization and extended dominion, it will be readily admitted that the white race more completely represents that form of mankind best fitted for dominion, and to represent the Divine Vicegerent. Man is, in fact, the only animal possessed of the power of estimating infinity; and thus the only one that can apprehend the Deity. The instinct of other animals readily leads them to display their affections and submissions to man, but entirely restricted to friendly social relations. There is in them a marked progressive improvement in their development, habits and instincts, but no true approach to mentality. The most highly organized mammal may possess instincts, habits, and powers vastly superior in some points to several of the lowest human beings, especially when in an imbecile or fatuous condition, or in savage barbarism, approaching the

* *Vide* p. 230.

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lowest condition referred to by Sir John Lubbock, as "worthy to be called a man." Omitting the imbecile and fatuous human beings, the most savage and uncivilized individuals of the human family possess a marked characteristic of not only defending themselves against lower animals by means of their natural structure, but can construct weapons of offence and defence, which the highest anthropoid ape never has been able to do. Though capable of being trained to imitate many of the actions that they see man performing around them, they can only make use of nuts, hard fruits, stones, and branches of trees to act offensively either upon man or other animals. In domestication, although a pet monkey has long been accustomed to sit by the side of a fire or stove, and daily seeing it kindled and kept up by the addition of fuel, it has never yet been known to add a small billet of wood or bit of coal to the fire, but continued to sit shivering at the cold stove, with plenty of combustibles lying around. This is certainly a very marked characteristic of the most elementary kind, capable of separating man from mammals. Man by his language is still more distinct "from the beasts which perish," and also by his inventive arts and intellectual operations of his genius, and the boundless sense of the Infinite, which raises in him the true sense of devotion.

In strong contrast to the most elevated anthropoid apes, who have never yet succeeded in constructing any offensive or defensive weapon, we may refer even to the lowest and most uncivilized of the human family who can not only construct weapons but use them for the best purposes of offence. I beg to notice the Yacoots, an arboreal human race living in the forests of the Malay peninsula, who construct weapons, spears, and arrows tipped with metal, and by means of a long tube of hollowed bamboo discharge their small arrows with such dexterity and precision that they can, at the distance of forty yards, strike a mark of the size of our half-crown, three times out of four chances; a degree of precision not easily equalled among more highly-favoured races; which is evidently a compensation for their other disadvantages of bodily weakness and low mentality, evidently exemplifying a physical law of nature.

The next, or Black variety, including the Caffre, Hottentot, and Bushmen, as well as the Polynesian, show a higher development of mentality in a more varied construction of war-like weapons, and of canoes and other means of transport.

When, again, we rise to the Ethiopian race (those on the coast of Guinea and in the interior of Africa), there can be no doubt of the vast progressive rise in the human scale of bodily powers and mentality. Their history, from the earliest times, has recorded the existence of populous kingdoms, governed

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by sovereigns leading them to aggressive wars, or repressing the aggressions of others. This has been recorded from the earliest history of Egypt in the Mosaic record, and still obtains, as is described by our enterprising explorers Livingstone, Speke, Sir Samuel Baker, and others. This race, consisting of many and various tribes, first indicates the execution of the second prerogative contained in the divine command. The first, "To increase and multiply," being amply and fully performed throughout the whole animal kingdom; but the second, "To subdue the earth," has been for the first time exhibited by the Negro race in the usual form of subjugation, brutal wars, turbulent despotism, and oppressive slavery.

The history of Egypt must early have exhibited the powerful mixed races alternately, brown or black, in superiority. The ancient Egyptian hieroglyphic paintings, exhibited upon the pyramids and other ruined structures of ancient Egypt, indicate, even before the reign of the Pharaohs, the existence of negro sovereigns; and there are other indications that the religion was a compound of Asiatic and Nigretian elements. The Brown, or Egyptain race, were evidently Asiatics, consisting principally of the Brown, and a certain mixture of the White races. Connected with these you find along the coast some of the Red variety, which were an advanced class when compared with the Africans. This Red or Brown variety was much more fully developed on the western continent of America, where the remains of the early structures of Mexico and Central America are the great monumental records from the earliest date of these races; exhibiting structures very analogous to those of Egypt.

The great discoveries in other parts of the world also show an early extension of the Brown race, as in the splendid monuments of Cambodia. Although we look to a very early date for the chronology of mankind of the sixth pre-Sabbatic day, still there must have been several fresh flows of population as the world enlarged. Thus we are inclined to consider that the Hindoo belongs to a later flow, possibly contemporaneous with the Adamic race. It is stated in North America that the Red Aztecs appeared in North America at a comparatively recent date; about the 12th century. It is amongst these later races contemporaneous with the Adamic that we all enjoy the promises to Abraham.

In opposition to the view of mankind being the offspring of a single pair, I would urge in regard to the Yellow, or Mongol race, from its very scattered points of existence, that neither the race *in toto*, nor the numerous scattered situations where we find the Yellow race, could have originated

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from any single pair, but that each gradually extended, dependent on facilities around their original centre. The great body of the Mongol, or Yellow race, is spread over China, Japan, and the east of Asia, while the Laps and Fins and Esquimaux along the northern coasts of the Arctic Ocean, and the Malays in the promontories and islands of Asia and the Eastern Archipelago, are found extensively distributed.

The White races (sometimes restricted to the Caucasian) were very early distributed over all the world; and from their great advance in civilization, literature, and science, we are tempted to consider that a particular reference to this race may be discovered in the Genetic record. Although it is not absolutely necessary that they should have been created altogether so early as the Turanian, or Yellow races, yet we must claim that they were created along with the pre-Sabbatic races. I am also inclined to maintain that they were early distributed over several parts of the old hemisphere, especially of Europe, and many of the localities of the Celtic inhabitants were already peopled, as by the Picts, &c. I am also inclined to consider that the later flow of Celtic population from the lofty Himalaya, proceeded westward in three main streams, one along the north coast of Africa, crossing at the Straits into Spain, and, as an Iberian branch, crossing to Ireland, spread out in the dark-eyed brunette races of the south-west; while another stream, traversing Greece, Tuscany, Switzerland, France, and Belgium, landed in the south of England, crossing to Devonshire and Cornwall from Brittany. These also spread through Wales. The third, or northern branch, sweeping through Scandinavia, Norway, Denmark, and the Danish isles, landed in the Hebrides, and spread over the mountain regions of Scotland, and the east and north of Ireland.

The aborigines of the British isles, as well as of France and Belgium, may have been the same races, though overspread by the tide of population from the lofty mountain regions of India. In the Hebrides, and northern islands of Scotland, these eastern Celts encountered the Pechts, or Picts, a people having the same race-character, and after various struggles and conquests, became amalgamated with them; and a similar result may possibly have followed the case of the other branches of the eastern tide of population. The name of the Western Isles is Ii Bridan—the islands of Briton. The early inhabitants of Wales, who encountered Cæsar on his descent into Britain, had the same name. Crossing the Channel to France, the natives of Britain encountered a similar race, and the country still retains the name of Brittany.

If we trace the history of the nations of Europe, we find

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similar successive tides of population spreading over the land; and even at the present time the tide of emigration is becoming every day more and more wide-spread over the world. Possibly the late diggings among the caves and gravel-pits of France, Switzerland, Denmark, &c., which have discovered some human remains mixed among flint, bone, stone, and other implements, may indicate the primary inhabitants of these countries covered up by a slight deposit of Pleistocene gravel and clays, extending within certain limited bounds; thus indicating traces of the early population. But I have much more confidence in the account given in the Genetic record. Chronology, properly studied, ought to embrace the whole period of that record when, "in the beginning omnipotent force, boundless and eternal, first initiated the universe by His word." The early period, however, can only be expressed in relation to the order, there being no means of defining very accurately small portions of time, except in very familiar popular language. A day is measured, of course, by the diurnal revolution of the earth; a month by the changes of the moon; a year by an annual revolution round the sun, which was established in the heavens on the fourth day of creation—"To be lights in the firmament, to divide the day from the night; to be for signs and for seasons, for days and for years."

We now come to that period when God rested from the works which He had made; and we are led to consider the Why Adam was created in Paradise,—for the purpose of serving the Lord ("Obed in Adami"), as we find that was his first act of service after his being told,—"Of every tree of the garden thou mayest freely eat," but at the same time warned that "Of the tree of the knowledge of good and evil thou shalt not eat of it, for in the day thou eatest thereof thou shalt surely die." From succeeding events recorded in the Bible, we know that this did not result. We will explain this further afterwards.

The first service, then, which was imposed on Adam was to give names to "every beast of the field, and every fowl of the air, which were brought to him, and whatsoever name he called every living creature, that was the name thereof." As he was still without "a help meet for him," God formed Eve, and Adam named her in right of power of nomenclature, "This is now bone of my bones, and flesh of my flesh; she shall be called woman;" *i.e.* "womb-man."

The very important events which are recorded in the third chapter of Genesis, and generally described as the temptation

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by the serpent, may be fairly interpreted in a somewhat different manner to that commonly expressed. "Naghash," translated "serpent," and fancied to be a reptile, may also be translated "anxious and impulsive desire" to acquire the knowledge of good and evil.

Next we read that "Adam and Eve hid themselves from the presence of the Lord among the trees of the garden." (This explanation is more rational than the sewing together of fig-leaves to make aprons.) The rest of the subject exposes the paltry cowardice of the now carnal man, conscience-stricken, attempting to exculpate himself from transgressing, or risking the danger of eating or even touching the tree of knowledge of good and evil, and shifting the blame on the woman. The curse on both, of toil and labour in the earth, and the pains of childbirth, was completed by their expulsion from Eden, and their return prevented by Cherubim and a flaming sword turning everywhere to prevent all access to the tree of life in the condition in which they then were.

The following chapters of the record give the genealogy of the Sabbatic Adamic race.

In the sixth chapter, "When men began to multiply on the earth, and daughters were born unto them," from both streams of creation, "the sons of God" (probably referring to the sons of the Sabbatic Adam) "saw the daughters of" pre-Sabbatic mankind, "that they were fair, and took them to be wives of their choice," as Cain had already done in his progress eastward of Eden among the people of Nod. The conduct of mankind from both sources seems to have displeased the Lord. When the wickedness of men became so great, and their imaginations and thoughts continued to be only evil, the Lord is represented as grieved, and declared,—"I will destroy man whom I have created; both man, and beast, and creeping thing, and fowls of the air; for it repenteth me that I have made them."

It is necessary to keep in view that the term "son" does not always mean the offspring of generation, but it often includes the stranger within the domestic circle; as I will fully notice shortly.

Noah being divinely selected and directed to build an ark of gopher wood, with a most complete specification of its length, breadth, and structure, for the purpose of containing a certain number of the different animals living, it may be, upon the great inter-continental island in the Atlantic (the Atalanta of Plato), and connecting the two continents, with marked traces of the westward repression of the North American continent just beyond the tropics, evidenced by

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the plications of the strata first noticed by Professor Rogers, late professor of natural history in Glasgow, who had formerly been one of the surveyors, and published in the report of the geology between the Atlantic and the Mississippi. This Gulf Stream has been described by the late physicist of Cambridge, Mr. Hopkins, as likely at one age of the earth to have flowed north into the Arctic Ocean. We may therefore speculate that it was not restricted to its present size till by the crushing back of the continent above referred to.

After all things were prepared, and its important living cargo stowed away in the manner we are so familiar with, "in the second month, and seventeenth day of the month, the same day were all the fountains of the great deep (tohu, vohu) broken up and the windows of heaven were opened," and rain poured on the earth for forty days and forty nights, during which the waters increased so greatly as to float it above the surface of the earth on which it was built. The Diluvian waters rose above all the eminences and high hills of the Atlantic region: thus the great rivers described as flowing from the garden of Eden may have been situated upon this peninsula during the early age of its formation, when the diameter of the spheroid, and the axis on which it revolved, were different from what now obtains.

This may be inferred palæontologically from the reptilian fossil remains of gigantic size which are stored up in the lias formation, and found largely distributed through the south-east of England, and almost restricted within a short distance of that locality.

To return from this digression. We may suppose that the ark floated upon the surface of the ocean by way either of the Straits of Gibraltar, or on the sea of the Sahara, the now sandy desert of north Africa, but now closed by the upheaval of the volcanic isles of the Canaries and Cape de Verde, &c.; or it may even have been carried over the Landes (the narrow neck of land along the base of the Pyrenees) into the Mediterranean, and so eastward to the locality described in the record as in Armenia, near the peak of Mount Ararat, 16,000 feet high; and till very lately unscaled by man.

In order to reduce the Diluvian flood, God caused a powerful wind to pass over the earth, and the waters assuaged. The fountains of the deep were stopped (possibly by the submergence of the isle from expansion of the Earth-crust), the rain from heaven being also restrained.

There seems no necessity for detailing minutely the several events with which you are all acquainted from your Bibles, but I mean to suggest a different mode of interpretation from

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that usually adopted. I believe it is now very generally believed by Biblical scholars that the extent of the Flood was much restricted, to what used to be considered its universality. "That the waters prevailed exceedingly upon the earth, and all the high hills under the whole heaven were covered fifteen cubits upwards above the highest mountains"; now ascertained to be more than 30,000 feet, or between five and six miles high. Possibly it principally occurred within the narrow region of Atalanta, as described by Plato, and a few of the regions immediately adjoining, as in Amiens in France, and in the south of England.

Possibly the cave and other diggings in Denmark and Switzerland may relate to a somewhat more recent period.

The more important consideration, however, I consider to be the chronology, which becomes more easily determined when the streams from the pre-Sabbatic and Sabbatic unite, and we begin to perceive, from an earlier post-Diluvian period, when the descendants from Shem, Ham, and Japhet are described as the sources of the human population of the earth. As I have already suggested, Shem may be viewed as the lineal descendant of Noah by generation, but Japhet and Ham represent two of the pre-Sabbatic races of mankind, the Black and the White, at the time existing in the neighbourhood of Noah.

The description of Noah's conduct after the Flood may be supposed to be so well known as not to require a minute detail, but I must protest against the grounds stated in the Bible, or to credit that the curse of Noah, awakened from his drunken fit, should have so changed the colour of Ham that his descendants shall be servants or slaves, which continues till this day.

Passing to another important chronological term, we come to the account of the Tower of Babel, and the miraculous confusion of tongues, 2247 B.C.; the genealogy of Shem, who was 100 years when he begat Arphaxad, two years after the Flood; and then follows the genealogy till we come to the very important descendant Terah, who, when seventy years old, begat Abram, Nahor, and Haran, 2056 B.C.

We now arrive at perhaps the most important theological period—the call of Abram. This is the ground of our share in the blessings of the Gospel, promised to all who accept the promise to Abraham. Then follows the history of Abraham, who departed—Heaven-directed—when seventy-five years old, out of Haran, taking with him his wife Sarai and Lot his brother's son, and all their substance they had gathered, and the souls they had gotten in Haran, and journeying into the

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land of Canaan. This region derived its name from Ham, of the household of Noah, lying between the Mediterranean on the west; the wilderness of Paran, Idumæa, and Egypt on the south; Arabia on the east; and Lebanon and Phœnicia on the north. Its length from Dan to Beersheba is about 200 miles, and its breadth across, from the Mediterranean to its eastern frontier, about 90 miles. The course of his journey lay through the country then peopled by the Canaanites, where the Lord appeared to him in Shechem, and said, "Unto thy seed will I give this land." He there built an altar, calling on the name of the Lord. And as there was a famine in the land of Canaan at the time, he journeyed southward into Egypt, where the great chronological monuments continue to determine, not only the age of the Hebrew patriarch and the human race from which he sprang, but also to evidence that the other families of the earth were derived from a much more ancient chronology.

It will be necessary at this stage to return to a view of earlier chronology, in order to trace the tide of population as it passes the current of the Sabbatic race, and in order to an intelligent comprehension of all the races of mankind till the Adamic and pre-Sabbatic families unite in the stream of the early population of the earth, it would be necessary to consider the different chronologies of China, India, and the northern regions of America, as well as their systems of astronomy, which have been greatly dwarfed by the prejudice that all mankind have been derived from the Adam of Eden; but as this would lead to a vast extension of the present communication, already too long, I must leave that out of consideration.

The Chairman.—I now call upon you to thank Professor Macdonald for the paper he has read upon an important subject: and I now invite the fullest discussion, which the paper, indeed, seems to require.

Rev. C. A. Row.—I cannot allow this paper to go forth from this Society without uttering a strong protest against it from one end to the other. When I read a paper once and cannot understand it, I am willing to attribute my want of comprehension to my own stupidity. When I read it a second time and cannot understand it, I question whether the fault lies wholly with me; and when I read it a third time and find, though I know something of the subject, that I am equally unable to understand the paper, then I lay the blame on it, and not on myself. Now, this has been the result in the present case. I cannot see the point of the paper at all, nor can I understand one single argument it contains, or one single position laid down in it. (Hear, hear.) There are in the paper a number of curious words which I fail to find

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in any dictionary, a number of most obscure phrases, and a number of whole sentences which are positively incomprehensible. I am inclined to think that the printers must have made many of the blunders; but I think the Professor would have done well if he had taken care to correct the proof-sheets properly. Here is one passage, on page 204, which has puzzled me vastly, and I suspect it must be some blunder of the printers :—

"Evidently dissatisfied with the utter barbarism proposed by Sir John Lubbock as the condition of 'the first man worthy of being so called,' as well as the inuendo referring to the gorilla, or some other creature not worthy to be so called, he clearly points out 'that utter barbarism is by no means a necessary consequence of all the races of mankind, however, whenever, or wherever originating."

Now, what that means I cannot tell, any more than the man in the moon. (Laughter.) I think the word "consequence" is a misprint, for I know from my own experience that the printers do make curious blunders sometimes. I remember that in one of the papers I read here myself, I quoted the words of St. Paul :—"The Cretians are always liars, evil beasts, slow bellies."—(*Titus* i. 12); but the printers made it :—"The Cretans are always lions and low-minded bullies." (Laughter.) I have, therefore, good reason to know that they make serious blunders sometimes——

Mr. Reddie.—But this is a quotation from the Duke of Argyll. I have no doubt, however, there is some mistake in it.

Mr. Row.—I am inclined to think there must be——

Professor Macdonald.—Lay all the blame on me. Do not find so much fault with the printers.

Mr. Row.—The next thing that strikes me is that where the Professor merely asserts a thing, or says he thinks it possible, he imagines he has proved it to be a fact. That is a fault running from one end of the paper to the other. Take page 212, where he says :—

"To return from this digression. We may suppose that the ark floated upon the surface of the ocean by way either of the Straits of Gibraltar"—

Of course, we may suppose it, but that does not prove the fact.

"—or it may even have been carried into the narrow neck of land along the base of the Pyrenees."

That is also possible, but I want a proof. Then he says, further on :—

"In order to reduce the Diluvian flood, a powerful wind passed over the earth to cause the waters to assuage. The fountains of the deep were stopped (possibly by the submergence of the isle)"—

Of course it is possible; but we want a proof. It is possible that you may put a £1,000 note into my pocket, but I do not think I shall find it there when I come to examine it. There are many people who are in the habit of continually referring to the bank of Messrs. Possibility and Co., and who allow people to draw on them to any extent, but they pay only in paper which

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speech, but the actual history of man which is recorded in language. I apprehend that the Greek language contains proof that, from the earliest dawn of history, the persons who used it were, long previous to their first use of it, a civilized race of men. I maintain further, that the changes of that kind in language are exceedingly slow. No doubt savages rapidly change their language; but their languages are not the vehicles of thought, while the Greek language contained the whole previous mental history and thought of the people using it. The word used by Homer for man shows the civilization of the race, and that they had observed that it was one of the prominent features of men to speak articulately. We trace a similar progress of language in the Saxon and English. We are all aware that the names of living animals in the English language are of Saxon origin; but when we get them in the form of meat upon our tables, their names are all of Norman-French origin. Now, any one can see at once that it must have required a considerable lapse of time for such a change to take place. In the same way we find, with regard to the Greek tongue, that whenever it originated, it shows that the Greek race must have existed in a previous state of civilization. If we trace the Greeks back to their ancestors, the same thing applies; and whether we trace them back to India, or wherever we go, we can find nothing to show that they originated in barbarism. We may do the same thing with regard to nearly all the civilized races of man, and we arrive in each case at a similar conclusion. (Hear, hear.) So far as history guides us, I do not know of any testimony whatever to show that during the historical periods any race of men whom we should call civilized have acquired their civilization, apart from some external agency which has been exerted upon them. Let us look at some of the savage races of the ancient world, who were not in that savage state in which we now find the savage races of Australia or the more degraded types of Africa, but who were still not what we call civilized. The first instance of a savage race of which we have any authentic account in history is found in the case of Scythians, who invaded Asia in the time of the Lydian kings. We get their character from Herodotus, who is certainly not always trustworthy, and who is too much in the habit of putting speeches into the mouths of persons when there was no reporter present to have reported what was said, and which speeches were no doubt composed by himself. Herodotus was a man who united in himself a singular, though not uncommon, admixture of credulity and scepticism, and no one can read him without being struck with the characteristic. Still it must be said for him, that, though he was in the habit of giving reports which show the extent of his credulity, he never reported what he saw himself. The earliest accounts of the Scythian race are in Herodotus, and then we find them again at the destruction of the Roman empire in the time of Attila. They were then existing in a greater state of barbarism than is found in the modern Tartars. Our knowledge of them is drawn from the accounts of Rubruquis and Galé, which, I think, may be taken as tolerably authentic, so far as the habits and ch[illegible] life are concerned. There is a considerable [illegible] Tartars of the

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no one will cash. (Laughter.) That is the case with many of the possibilities in this paper. I do not wish to go through them all, but I have a number of most serious objections to urge. Let us take up the main theory of the paper, that there were several creations. I am aware that it is a very debateable point, and that there is much to be said on both sides, but I fail to find anything in the shape of reasoning here, either on one side or the other; and we cannot be called upon to believe anything on the mere *ipse dixit* of any one. I want a distinct and good reason for what I believe, and I expect a person will tell me not only what he thinks but his reason for thinking so. I do not wish to occupy your time in discussing the negative portions of the paper; but I want to call your attention to the fact that its historical statements are entirely unsupported by historical evidence as facts. I am unable to find any evidence of these various migrations. No doubt they are possible, but it does not follow because they are possible that we have any evidence of them in history. Let me turn to the beginning of the paper, and to the important question raised though not debated there. I mean the important question raised by Archbishop Whately as to the impossibility of barbarous races raising themselves up to civilization; and I regret that I have not had time to read the Duke of Argyll's or Sir John Lubbock's observations on the subject. This question of the origin of civilization is a most important one. The Archbishop of Dublin has maintained, and maintained justly, that so far as history goes, it is impossible to prove or quote an instance in which a barbarous race have civilized themselves by their own power. It is some time since I read Archbishop Whately's book, and I am not prepared to say whether the reasoning he pursued is that which is described here by Professor Macdonald; but the Professor seems to think that he proved that could not have been the case, and that the Archbishop inferred the impossibility from the fact that it never had taken place within historical knowledge. Now this is most important, although it does not involve the whole argument. If it can be shown, as I think it can, from any real, apart from mythical history, that no savage race have ever civilized themselves, that is a strong ground for believing that man did not originate in a savage, but in a civilized state. So far I think the argument is exceedingly sound; but now let us have a look at the facts of the case. Let us look at the first stage of historical knowledge; and I will not deal with a mere set of myths. The Professor has referred to the myth of the island of Atalanta, and no doubt there is allusion to it in Plato; but I believe it is a pure myth, and I do not think it is worthy of being dignified with the name of history. The Greek race can unquestionably be traced back to a very early period. We have the Homeric poems, which furnish the strongest possible testimony to the fact that the Greek race was not in a savage state when they were composed; and it is certain, from the structure of the Greek language, that it did not originate with a race which was in a savage condition. Now, I have several times made observations upon language which have been misunderstood. In speaking of language, I have not meant the mere framework of

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speech, but the actual history of man which is recorded in language. I apprehend that the Greek language contains proof that, from the earliest dawn of history, the persons who used it were, long previous to their first use of it, a civilized race of men. I maintain further, that the changes of that kind in language are exceedingly slow. No doubt savages rapidly change their language; but their languages are not the vehicles of thought, while the Greek language contained the whole previous mental history and thought of the people using it. The word used by Homer for man shows the civilization of the race, and that they had observed that it was one of the prominent features of men to speak articulately. We trace a similar progress of language in the Saxon and English. We are all aware that the names of living animals in the English language are of Saxon origin; but when we get them in the form of meat upon our tables, their names are all of Norman-French origin. Now, any one can see at once that it must have required a considerable lapse of time for such a change to take place. In the same way we find, with regard to the Greek tongue, that whenever it originated, it shows that the Greek race must have existed in a previous state of civilization. If we trace the Greeks back to their ancestors, the same thing applies; and whether we trace them back to India, or wherever we go, we can find nothing to show that they originated in barbarism. We may do the same thing with regard to nearly all the civilized races of man, and we arrive in each case at a similar conclusion. (Hear, hear.) So far as history guides us, I do not know of any testimony whatever to show that during the historical periods any race of men whom we should call civilized have acquired their civilization, apart from some external agency which has been exerted upon them. Let us look at some of the savage races of the ancient world, who were not in that savage state in which we now find the savage races of Australia or the more degraded types of Africa, but who were still not what we call civilized. The first instance of a savage race of which we have any authentic account in history is found in the case of Scythians, who invaded Asia in the time of the Lydian kings. We get their character from Herodotus, who is certainly not always trustworthy, and who is too much in the habit of putting speeches into the mouths of persons when there was no reporter present to have reported what they said, and which speeches were no doubt composed by himself. Herodotus was a man who united in himself a singular, though not uncommon, admixture of credulity and scepticism, and no one can read him without being struck by that characteristic. Still it must be said for him, that, though he was in the habit of giving reports which show the extent of his credulity, he never exaggerated what he saw himself. The earliest accounts of the Scythian race we find in Herodotus, and then we find them again at the destruction of the Roman empire in the time of Attila. They were then existing in a greater degree of barbarism than is found in the modern Tartars, my knowledge of whom is drawn from the accounts of Huc and Galé, which, I think, may generally be taken as tolerably authentic, so far as the habits and character of the people are concerned. There is a considerable admixture of civilization among the Tartars of the present day, but they have had a mighty influence

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exerted upon them from without. They have had the Bhuddist religion introduced among them ; and whatever we may think of that religion, it is, at any rate, a much higher stage than pure barbarism could have invented, and would tend to soften and improve very much the character of the people. Here we have a plain testimony that the change which has taken place has been introduced *ab extra*. Let us take another race in the time of Julius Cæsar—I mean the Gauls. They had then a certain degree of civilization among them, but they were certainly not what we call a savage race ; and in them we have a remarkable example of a race in which, prior to their conquest by the Romans, we have small evidence of change ; but as soon as the Roman conquest took place, the change in them was astonishing. Within the period of a century the Gauls were so changed that they became practically Romanized ; and here we have a remarkable example in our favour, showing that a race not perfectly savage, but yet not civilized, made but small alterations ; but the moment an external influence was exerted upon them, they changed with the utmost rapidity. If we go into Egypt, we have no trace of the Egyptians having originated from a previously savage state. Professor Macdonald has expressed his belief that prior to the time of the Pharaohs there were Negro rulers in Egypt, which may be proved by the engravings on the pyramids ; but from my acquaintance with the history of Bunsen and the other various sources of Egyptian history, of which I have read much, I cannot see any evidence of this. Certainly, the Negro race does afford a wonderful example of a race continuing the same from the earliest times until the present day ; but that is a great proof of Archbishop Whately's position, that a barbarous race left wholly to themselves have never succeeded in civilizing themselves. It is undoubtedly the case that the Negro race, from the earliest times to the present day, have remained pretty much the same. We cannot say that they have greatly improved during the past 3,000 years, or that they have made any efforts to civilize themselves. If we go to other parts of the globe, we shall get the same testimony. We cannot, however, get that testimony from America ; for though undoubtedly a civilized race did precede the Aztecs, yet we cannot go beyond them for any authentic testimony, and we must beware lest we take mythical history for real historical evidence. A great many of the things spoken of do not rest on anything like substantial historical evidence. It is impossible to say whether the Egyptian race owed its civilization to a Negro origin, or to a far higher one. So far as the Assyrians are concerned, their civilization existed, and was evidently of a high type, at the earliest dawn of history. That is a fact, but all the rest is mere speculation, beyond the range of history. If we go beyond that range, we get launched into a region of speculation where all things are possible——

Mr. Reddie.—Do you not accept monumental evidence ?

Mr. Row.—Oh, yes ; I accept it to a certain extent, but it requires careful interpretation ; and you may adduce a great deal of monumental evidence which is useless for the want of careful interpretation. The monumental evidence as yet adduced has a large admixture of theory with it. There is

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so much of a theoretical character about it, that though I do not deny there is a considerable substratum of historical truth, a great deal of it is mere unproven speculation. I feel the greatest interest in all that is connected with Egyptian history, and I should like to know what has been the result of the attempt to decipher the new tri-lingual stone which has recently been discovered in Egypt. I should like to know whether it has at all enlarged our power of deciphering hieroglyphic inscriptions. But I maintain that the very character of the earliest hieroglyphs themselves presupposes that the Egyptian race possessed a considerable degree of civilization from the earliest times. (Hear, hear.)

Mr. REDDIE.—I did not quite mean what Mr. Row supposes I did by monumental evidence. I was not referring simply to the interpretations of the hieroglyphs. I have very little faith in them, and I find that Sir George Cornewall Lewis gives little credit to them. I was referring to the proofs which the existence of the monuments of antiquity themselves afford of the anterior civilization of the people who constructed them. There are a great many instances of this kind in Central America; and some of the most recent discoveries, even in North America, go to prove that a race more civilized than the Red man (who was once supposed to have been the original American) had existed where the Red man was afterwards found. But the whole of this question has already been discussed by us at some length. I read a paper myself, both here and before the British Association, on the subject; and I go further than Mr. Row as to the negative and positive proofs of anterior civilization; for I maintain not only that savage races have never civilized themselves, but that among the most degraded races, almost without exception, you will find what I call monumental traces of a previous civilization. And you must not altogether throw over traditions and myths. You need not believe in the myth itself; but the very existence of an ingeniously constructed story is evidence that the people among whom you find it handed down were originally equal to the task of constructing it; and when they have such stories, and cannot invent them now, that itself forms an argument that their ancestors were superior to them——

Mr. ROW.—I do not believe a myth, but I quite admit that a myth may be evidence of something else.

Mr. REDDIE.—I called attention to this matter in our first session, and then alluded to the fact that Mr. Pritchard, the consul in the Fiji Islands, who had lived there so long as to be almost a Fijian himself, gives an account of the stories current among those people which are quite Homeric in their character. Those stories are handed down among the people, not by a written literature, but from mouth to mouth, and repeated just as the *raconteurs* of the Continent, or the story-tellers of the middle ages, used to tell their stories. Mr. Pritchard's account of these Fijian stories is published in the memoirs of the Anthropological Society, and they go far to prove that those people have descended from an ancestry infinitely superior to themselves. We have not only no proof that savages have ever raised themselves to civilization; but Sir Samuel Baker goes even farther than that, and bears testimony to the

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great deterioration that has taken place in some of the African tribes, even within the memory of man. In many of those tribes you will find existing a mode of extracting metals from the ore which these people, in their present state, are thoroughly incompetent to invent, and which they only retain by handing it down traditionally from father to son. Sir Samuel Baker speaks very strongly upon this point, and he is perhaps the best authority we have upon African travel except Livingstone; and his accounts and Livingstone's perfectly coincide. Then, for another proof of the antiquity of civilization, you must take astronomy, which is common to almost all nations where they are not altogether sunk in barbarism. You not only get a knowledge of astronomy, but the same sort of knowledge as regards the constellations existing among all the ancient peoples; and that incidentally affords a strong argument against the whole theory of Professor Macdonald. I am sorry now to be obliged to advert to the paper before us, because I must say I quite agree with Mr. Row respecting it. The Professor treats his theories and his facts something like a magician, conjuring them up whenever he wants them in the most marvellous way, and just as they suit his fancy. He gives us three or four different creations—of yellow men, of black men, of men of all sorts, at his will; but he does not tell us, after all, whether the Adamic race were black, or white, or yellow——

Professor MACDONALD.—They were neither black, white, green, nor yellow. (Laughter.)

Mr. REDDIE.—Well, the addition of another colour only makes it still more puzzling. (Laughter.) He doubts the scriptural account of creation, and treats all the arguments on that subject very much as he treated the map of America on the wall, by ripping it up, in order to show us the direction of the Gulf Stream—cutting them up remorselessly. (Laughter.) But it is of no use to treat the matter thus. It is very easy indeed to tear up a paper map, but you cannot cut up a continent in that way. His various separate creations are obtained in a very curious manner; wherever he wants a migration or a new creation, he simply conjures it up with his wand in the most surprising manner, which reminds me of nothing so much as the kind of processes which were continually gone through in the tales we used to read, when we were boys, in the *Arabian Nights*. (Laughter.) But I do not think the polygenists will cordially accept his theory; for certainly the polygenists of the Anthropological and Ethnological Societies do not now believe in many separate creations; they seem always more than contented even with one! Professor Macdonald is evidently an anti-Darwinian; and there is a strong argument against the theory that the first man "worthy to be called a man" originated from some animal progenitor, in the simple question: How was the first human baby nourished? (Laughter) For a human baby is a most difficult creature to bring up, and a gorilla would certainly not take half the trouble that would be necessary. As to the further question of the possible growth of civilization, I referred at some of our previous meetings to the case of the Sikhs, who, though not in the most degraded state of barbarism, were still far from being civilized, and under the influence of Nanaka, a sort of Indian iconoclast and reformer,

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who, like Mahommed, set his face against idolatry, they have been raised to a far superior condition, and, like the Mahommedans in the vale of Cashmere, have very much advanced, both physically and morally; which I attribute to the influence of a purer worship. When we thoroughly consider what is the very essence of civilization, I think we shall find it flows from the exercise of the rational powers in that highest of all modes in which they can be employed, namely, in the worship of the Deity; which is the result of the being able to find out something higher and above all that is visible in nature, instead of bowing down ignorantly to stocks and stones, than which I can conceive nothing more degrading in its tendency upon the whole life. I do not agree with Mr. Row in his estimate of Herodotus and Huc. I think old Herodotus is a much safer guide than the modern. In fact, I do not believe Huc's book at all. He seems to me to be not only credulous, but he fills up his book with silly and nonsensical gossip, whereas Herodotus not only narrated what he saw most truly and carefully, but he was most cautious in distinguishing what he reported from others, and he frequently says he does not believe what had been so reported to him. I think it was Dr. Thornton who pointed out to us one night that the only instance of a thoroughly savage people mentioned by Herodotus was what he repeats about the Troglodytæ, and it may be a question whether they were not monkeys, and not men at all. As to the Scythians, they were not degraded into utter barbarism. I unquestionably believe that the human race sprang from but one man and woman, created in the image of God, and that the savage races have degenerated from them. When part of a tribe got once away from the rest, they would go down rapidly in the scale of civilization, as even we see our own degraded classes do in our own midst. I believe that when Herodotus and Homer and Hesiod lived and wrote, there were no such degraded beings in existence as there are now, but that they have been gradually going down and getting more and more degraded. I believe that is the only result which can be maintained from all the evidence of history, whether afforded by monuments or by myths. But all history should be used reasonably and critically. You are no more entitled to believe a statement contained in a book written by Huc or by Herodotus simply because it is there, and without careful and critical judgment, than you are entitled to believe a myth. But sometimes a myth itself is a great testimony to something beyond, even though you cannot take it literally and in the way in which it is put forward.

Mr. Reginald Stuart Poole.—I should not have ventured to address you this evening had it not been that I think I can afford you some information with regard to the tri-lingual stone which has been referred to. That tri-lingual tablet, or, as it has sometimes been called bi-lingual, (because the third inscription runs round the edge and was not at first seen,) was discovered at Taunis by M. Lepsius. Two other gentlemen, MM. Reinisch and Rossla, have also deciphered the inscription, and all three of the translations agree. The inscription is a complete one, and any one who will be at the trouble to take the three existing dictionaries of hieroglyphs by Chabas, by Young, and by Dr. Birch, will be able to translate the hieroglyphic inscription him-

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self. The time has come for us not to place so much reliance, as some have done, upon extravagant theories on this subject, but to bring to it a little sober criticism, and to take the best evidence we can find, doing as De Rougé, in France, and others elsewhere have done, and endeavouring to get correct information. I wish to speak with all respect of Bunsen, who has been much misunderstood. That large-minded, God-fearing old German, though he differed from most of us, was a man of most extraordinary fancy. He was not a hieroglyphic scholar himself—he was only imperfectly acquainted with hieroglyphs ; but he used these monuments, not to tell men exactly what they told him, but to build hypotheses upon ; and in doing that he did great service. The man who raises hypotheses does a great service, because he exposes himself to attack, and a great deal more light is thrown upon the subject, even if his hypotheses are destroyed in the discussion. That is what Bunsen did, and I hope you will be careful always not to fall into the mistake of taking Bunsen as the type of Egyptologists. If you take the works of Lepsius and Reinisch in Germany, of De Rougé and Chabas in France, and of Birch in this country, you will find they have treated these Egyptian monuments as fairly, perhaps more fairly, than Greek and Roman authors have been treated by many historians. They labour over and over again in most difficult ground to arrive at the truth ; and if you examine their work, you will find that, chronologically, they carry back some of their inscriptions to 2,000 years before Christ. In support of that, you have a succession of monuments of different ages and of different styles, as in Greece you have work of the time of the temple of Ægina, of the time of Praxiteles, and of the time of Lysippus. So in Egypt you have a succession of ages as well as a growth of art, which you see at once could not have been brought about in a day. I should warn you not to expect strict accuracy in these monuments, because there you get, for instance, typical colours representing the different races of men—the Negro, the White and the Brown man of Egypt standing between the Black and the White. That, however, would bear strongly on the age of the different races, and also on the antiquity of the barbarous races, because there you have the Negroes represented in the matter of clothing in the same condition as in the present day. And now, in conclusion, let me beg you to treat with the greatest respect all attempts—I will not say to harmonize, because they must be in harmony—but to point out the connection between Scripture and science, when they are made in so thoroughly reverent and God-fearing a spirit as that which has been exhibited by Professor Macdonald. I think that everything he has said has been said in that true God-fearing spirit to which we must all arrive.

The CHAIRMAN.—What is the length of the inscription on the new stone ?

Mr. POOLE.—It is somewhat shorter than the inscription on the Rosetta stone, but it is a very clear inscription.

The CHAIRMAN.—Does it contain any new words ?

Mr. POOLE.—Yes.

Mr. REDDIE.—I have a few words I would wish to add, in consequence of the concluding observations of the last speaker relating to the Scripture

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references in the paper of Professor Macdonald. On page 208 the Professor says :—

"The divine command 'to subdue the earth' has been for the first time exhibited by the Negro race in the usual form of subjugation, brutal wars, turbulent despotism, and oppressive slavery."

Now I must protest against the command to "subdue *the earth*" being supposed to have any connection with anything of the sort. It was a command to cultivate the earth, and had nothing whatever to do with fighting and cutting other people's throats. Then there is another instance, on page 210, of this strange misapplication of texts. Professor Macdonald says man was warned—

"That 'of the tree of the knowledge of good and evil thou shalt not eat of it, for in the day thou eatest thereof thou shalt surely die.'"

And adds—

"From succeeding events recorded in the Bible, we know that this did not result."

Now I say that what was stated did result, for man became a mortal being. To say that Adam was to drop down dead at once on eating the forbidden fruit is to say that which common sense repudiates. Then, in another passage, the Professor "protests against the grounds stated in the Bible," or "to credit that the curse of Noah should have changed the colour of Ham." But the Bible does not assume or state that the curse of Noah changed Ham's colour. It says nothing of the kind. Probably Ham was of a dark complexion, and it is a remarkable thing that the name of his son Cush in Hebrew means black, and Egypt is called Cush after him. But there is nothing in the Scriptures which tells us that the curse of Noah made Ham grow black.

The CHAIRMAN.—I need scarcely say that I differ almost entirely from the conclusions of Professor Macdonald. I think it is important, as Mr. Poole has said, that these subjects should be discussed in a reverent spirit; but when theories are brought forward they should be supported by facts, and I cannot see that Professor Macdonald has supported his theories by any facts. I do not believe that his theories are consonant, either with a fair interpretation of Scripture or with the facts of science. As to the manner in which we are to determine whether mankind sprang from a single race, or whether they sprang from several centres of creation, there are two ways of dealing with that subject. One way is to believe that the truth has been revealed to us by God, and that we find that revelation in the Bible; and we then come to determine the question from a plain, fair, and honest interpretation of the words of Scripture. That is one way of arriving at a decision; but there are some people who tell us that the Bible has no more authority than any other book, and that the subject must be decided on purely scientific principles. The subject is one that has long been discussed; and those who maintain that the various races of men sprang from many centres of creation, have striven to bring forward all the evidence they can from science, while those who oppose them have brought forward all the arguments open to them to combat those

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views. That, I think, is a fair and legitimate mode of dealing with the subject; but I cannot say that Professor Macdonald has dealt with it in that way. He has stated various things as probabilities, but he has not given the slightest direct scientific evidence in support of them. He has given no geological evidence, and no evidence from history. He has stated what were the antagonistic views of Sir John Lubbock, on the one hand, and of Dr. Whately, on the other; but he has not combated the views either of one or the other in the slightest degree. And now, perhaps, I shall be unable to avoid repeating to some extent matters which have already been made the subject of discussion in this Institute. A few years ago it was supposed that there was direct physical evidence that the whole human race could not have sprung from a single pair. That view was held for many years by those who were antagonistic to the Bible; but what do we find is the case now? We find that those scientific theories have disappeared; that they have been supplanted by other theories which are now more popular; and those who still say that the human race did not spring from a single pair, are forced to admit that there is no scientific objection to offer against the whole human race having sprung from a single pair. I think, therefore, that we may now get rid of the physiological objection. The physiological testimony is now admitted by all the most distinguished physiologists, even if you take Mr. Darwin or Professor Huxley, to be, if not in our favour, at all events, not antagonistic to us. The majority of physiologists tell us that there is no reason in the science of physiology for attempting to maintain that the whole human race could not have sprung from a single pair. Professor Macdonald tells us that that is negative testimony, and that, if we are to meet this question scientifically, we must have positive testimony. I maintain that science gives us not negative testimony, but strong scientific, positive evidence in our favour. The perfect hybridization, if we may so call it, of the whole human race stands as a great positive fact, and not a negative fact, to assure us that the whole human race could have sprung from a single pair. Let us turn to another branch of science—history, the history of civilization, and all history, give us one testimony which is antagonistic to the idea of man having risen from an original state of barbarism, or from any improved animal or irrational creature. The whole of history, as a science, is antagonistic to that idea, and history goes further back than the time of the Greek writers. I think that old saying which calls Herodotus the father of history should be set aside, for surely the Bible has every right to the title, if only as an authentic historical record. It brings truths of direct and positive human history which can be proved far anterior to the Homeric poems, or to anything that can be found anywhere else——

Mr. REDDIE.—I always understood that Herodotus was merely considered the father of profane history; and I do not think that the Bible should be included with profane history, as if it were nothing more.

The CHAIRMAN.—But we must take history as history, whether profane or sacred. I am leaving out of consideration the inspiration of the sacred record; and I say that, looking upon it merely as a historical record, it is the most ancient history which we can find anywhere, and it always leads us

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up to the highest degree of civilization. Then, not only the Bible, but many subsidiary matters, lead us to the notion of the unity of the human race ; and evidence of this is found especially in the progress and diversities of language. Language is not only a most marvellous instrument for the articulation of sound, but those who use it show that they have a unity of mental organization which to my mind proves that they came from one single stock, because the peculiarities of that organization can be traced through all the differences of so-called different races of the earth. There is a unity running through them all which is most striking. Not only have you unity in the structure of language, but you find a unity among them in the myths of history, and a unity of traditions. When you take the language, the traditions, and the mythology of the human races into consideration, you find that some of those races which you would have thought were furthest apart, approach most closely towards each other. Some of those who, from their personal appearance, seem to belong to different species, are really most closely allied. For instance, it was thought at one time that the Hindoo and European races were as separate and distinct from each other as black and white. The Hindoos, though not negroes, are essentially a black race, and some of them you will find to be quite as black in the countenance as negroes. But yet it is now acknowledged by the common consent of all scientific men, that the English and the Hindoos are descended from the very same race, using the same type of language, and not so far separated from each other as are the Englishman and the Jew, who are both white men. Indeed, so much are the Jews white men that it is sometimes hard to distinguish them from the English—although you also have black Jews, which gives us another independent proof of the point I am laying down. There is one point in Professor Macdonald's paper which I confess I cannot uuderstand. I cannot understand why he restricts the Flood to the region of Atalanta. If there is anything whatever to be depended upon, or any knowledge to be derived from the universal traditions of the human race—and this is a phenomenon not easily explained—it is that the Flood certainly did overwhelm all the races of men which were upon the earth. There is not one single human race from which, however barbarous it may be, you cannot find evidence in its traditions, in the midst of all its barbarism, of the destruction of mankind by a flood. As to the Professor's theories of the number of original creations of different races, I cannot find any support for them anywhere. I cannot find the slightest reason for such a belief in the inspired book ; and I fail to discover anything in its support in any scientifice evidence, from whatever source it may be derived. All the scientific evidence points out most strongly, and by the most powerful arguments, not only the possibility, but the extreme probability, of all the human races having descended from a single pair. How any man can take the inspired record—the New Testament and the Old Testament together—for his guide, and maintain that that Bible gives any authority for such a doctrine as that of these diverse races, I cannot at all understand. We therefore find that the Professor, when he is obliged to get over the idea of the universality of man's form, tells us that the Adamic race fell. But what did they fall to ? According to his theory, they fell into the position of the

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pre-Sabbatic races: they became degenerated. They fell into the condition of the races that were created originally in a state of degradation, and yet those pre-Sabbatic races, according to the Professor's own hypothesis, were created in the image of the Elohim! The Bible tells us that a single pair were created in a state of holiness and perfection, from which they fell, and that all who have succeeded them have consequently been born in that fallen state. That is a plain honest statement by which I will stand, and I cannot find any contradiction of it in science, if you mean by science those facts which are displayed by the world itself. Trace back all past history, go among all the human races with which we are acquainted, and you will find that they all bear the sad impress of the fall of man from innocence. Nowhere will you now find perfect beings: there is always a want of harmony to be found amongst the human races in their moral development, which you do not find existing in any of the other parts of God's creation; and nowhere but in the Bible do you get anything like a full, plain, and accurate account of how such an awful jar or discord could have made its appearance in the creation of an all-wise and all-good God. I think natural theology proves indisputably that we are the creatures of a God of infinite wisdom and goodness; and the Bible tells us that we have fallen from the state in which He created us; but He has appointed a remedy by which the whole human race may be restored to their former position. One of the greatest proofs of man's unity of origin is found in the effect which the truths of Christianity have exercised on mankind. The truths of Christianity have been found perfectly adapted to all races. There is no race which is too barbarous to be civilized, and there has never been such a civilizing influence in the world as the doctrines of Christianity. Christianity has shown itself capable of raising the most degraded savages to a state in which they were to be envied by the most highly cultivated. Take a child of the lowest Negro type—a child of the Fijian Islanders, or the child of a Bushman—and it has been proved over and over again that such a child can be made as good and upright a creature as any one among ourselves could be. I say, therefore, that all races of men are capable of being raised from degradation to high moral excellence; and we find that there is no great and impassable gulf separating one race from another, and rendering one race more incapable than another of being raised to that high position in which man was originally created. I have the greatest possible respect and friendship for Professor Macdonald, and I trust he will not suppose that anything I have said to-night applies personally to him. I have a strong feeling of friendship for him, but I think these papers should be discussed fully and fairly. I am sure that in his own mind Professor Macdonald has the greatest reverence for the Bible, and would not willingly state anything which he thought would be offensive to those who hold their faith in that Bible as he does. But we must meet these questions on the grounds of pure science; and I think he has failed to make out that his theory is a true interpretation of the Biblical record, or that it is supported in the least degree by any of the subsidiary sciences which he has not so much called in to his aid as simply referred to.

Mr. Row.—I should like to ask Professor Macdonald how he accounts for

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the disappearance of that island of Atalanta after it had been made use of to stop the great Flood. It was said to have disappeared.

Professor MACDONALD.—Mr. Row asks me to account for the disappearance of a thing which he says never existed! (Laughter.) At this late period of the evening I will not detain you long, but I must make a few short passing remarks on what has been said. The first person who rose to extinguish me, at once gave three grounds for his mode of understanding a paper. If he read it once and did not understand it, he supposed he was stupid; if he failed to understand it on a second reading, he still supposed that he was stupid; but if he read it a third time, and even then could not understand it, he supposed the stupidity must be in the paper——

Mr. ROW.—I did not say I attributed it to the author. I said that if I failed to understand the paper on a third reading, I thought the fault did not altogether rest with me.

Professor MACDONALD.—Well, even with that correction, what I would say is this, that if a person gets up and tells me "I cannot understand this," I feel inclined to do what I can to help to clear his understanding; but when he goes through the paper two, and even three times, and declares it altogether unintelligible, what possible chance could I have of satisfying his mind? (Laughter.) I therefore make no attempt to answer Mr. Row's objections to my paper. It is quite right that he should find fault with me for not adducing a single reason in it, if he thinks there are none: but I fancy it is because he is so unreasonable himself that he does not understand my reasons. He demands an exposition of facts, and a deduction from those facts; but the principal object of my paper has been to attract attention to the future examination of the subject. The first chapter of Genesis tells you the succession of creation in six periods, and that man was created in the sixth, with all the powers and properties which enabled him to subjugate the earth. My friend, the secretary, who is agriculturally inclined (laughter), thinks that that subjugation of the earth refers only to the cultivation of the soil and the extermination of thistles. (Laughter.) As to that I have very little to say. Any one who reads the first chapter of Genesis honestly and reverently will see that mankind were created on the sixth day; and it does not require any depth of thought to see that the sixth must have preceded the seventh. But then you shut your eyes to the second chapter, and say, "we have a general *résumé* of what took place, and we will start from that point and that day when God had rested from all the works which He had made." Of course the work of creation was then completed, and God was resting, (as we all do,) from His labours. God had already created Adam, that being the general name for mankind; but the record goes on to describe that He then created the spiritual Adam and the spiritual Eve, they being the creations of the seventh day——

The CHAIRMAN.—You have failed to point out the passage which shows that the Adam and Eve of Paradise were created on the seventh day.

Professor MACDONALD.—Gen. ii. 7-21. It is mentioned in my paper that they were created on the seventh day; and if you read your Bible you will find that God rested on the seventh day——

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Mr. REDDIE.—Yes, from *all* His works.

Professor MACDONALD.—From all that He had made; but that did not exclude Him from doing what He then desired to do——

Mr. REDDIE.—Then He did *not rest* from all that He had made.

Professor MACDONALD.—Then you disbelieve the Bible. (No, no.)——

The CHAIRMAN.—But you have not given us any proof from the Biblical record that the Adam and Eve of Paradise were created on the seventh day.

Professor MACDONALD.—I do not require to prove it. I think the proof of Biblical authority is quite sufficient; and if our excellent chairman and very worthy divine requires me to produce proof against his prejudice, I have nothing further to say. With regard to the general objections against my paper, very much fault has been found with it for being very ill written and confused. Now, that I completely admit, and I have already said, in passing, that I want to relieve the printer from the imputation of the blunders which have been thrown on him. But I say there is in that paper the statement of a truth which ought to be believed,—that mankind, the present population of the world, were originated from these two sources. God created man on the sixth day, male and female, with all the powers and properties which the record sets forth; and there is one characteristic which I may notice in passing, which gives us a distinction between the man of the sixth day and the man and woman of the seventh day—Adam and Eve. The unrestricted use of all the products of the vegetable world and all the fruits of the trees was given to the man and woman of the sixth day—the restriction as to the tree of life and the knowledge of good and evil was entirely confined to Adam and Eve. The result of that forms a subject which, in mixed assemblies like this, we cannot enter fully into. It is sufficient to say that the fall was followed by instant expulsion from Paradise, and Adam was prevented from ever again going near to the tree of life, because another means was provided for him. Much fault has been found with me on the ground that there is a want of proof as to what I have said concerning the pre-Adamic people. To suppose that they could not become equivalent to the Adamic race after the fall is, I think, a forced interpretation——

The CHAIRMAN.—I cannot conceive from this paper where we are to find the Adamic race. Among all the races of the earth how are we to know which is the Adamic race?

Professor MACDONALD.—The Hebrew race——

The CHAIRMAN.—They alone?

Professor MACDONALD.—They and their descendants alone. But the great object I had in writing this paper was to ask you to read your Scriptures and to read the whole of them. The most important sentence that ever was penned occurs in the first chapter: "In the beginning God created the heavens and the earth," and from that everything springs. There is a consecutive progress in the six days of creation, and the sixth day, marked by the creation of man, was so important that it is referred to all through the subsequent parts of the Scriptures. "Six days shalt thou labour and do all thou hast to do," has reference to it, and then we come to the blessing of the

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world and the universal rest on the seventh day, a blessing which all attempts to invade have failed. Is it not a blessing to mankind that they have that seventh day? That portion of the subject, however, is involved in a certain amount of difficulty from the fact that the seventh day was changed to the first day for the Sabbath——

Mr. REDDIE.—It was changed by the Apostles, I believe.

Professor MACDONALD.—It was changed by the Adamic race: the Apostles were of the Adamic race——

The CHAIRMAN.—In the records of the Houses of Parliament Saturday is always recognized as the Sabbath. It is always *Dies Sabbatiæ*.

Mr. ROW.—Do you consider the Carthaginians and Phœnicians as Adamic? They certainly showed a descent from the Hebrew tongue.

Professor MACDONALD.—I do not think it is worth while to go into that. That incidental objection has no bearing whatever upon the question——

Mr. POOLE.—The language of Hebrew was not the language of Abraham: he spoke Syriac. The language of the Carthaginians and Phœnicians was the Syriac language. Whether that was Abraham's original tongue is another matter.

The CHAIRMAN.—But if there is unity of race, the whole Semitic race would be united together.

Mr. POOLE.—Without question. But the question is whether Abraham did not adopt a language in Syria, as he also adopted another in Canaan. The Cuneiform is entirely a new language, spoken in Abraham's district, and not the original language.

Mr. REDDIE.—However, it does not follow that diversity of language precludes unity of race.

Professor MACDONALD.—I only regret that my paper has been so carelessly prepared for such hypercritical observers as we sometimes meet with. I was not at all prepared to enter into the comparatively modern matter of tracing language down from the days of Herodotus. If language has not an earlier origin than that, I am very much mistaken. But the way in which my paper has been received, and the objections which have been made to it, have convinced me of one thing. On a former occasion I doubted whether I was a proper person to be a member of this Society, but now I doubt no longer, and I must say that from this time forward I withdraw from the Society.

Mr. REDDIE.—I beg to remind Professor Macdonald that he is not now a member, he having withdrawn already.

Professor MACDONALD.—I am very glad to hear it. As I am now outside the Society, I can only thank you for the kindness you have shown me. You have dealt me rather hard measure, but I will take care I never expose myself to it again. I can only thank you for the patience with which you have heard me. As for Mr. Row's remarks, I do not think much of them, and therefore I have no feeling upon that subject.

The Meeting was then adjourned.

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ZOOLOGICAL TABLE.

(*Vide* p. 206.)

Pre-Sabbatic Mankind.

On the 6th Creative Day.—Gen. i. 26 to the end.

Black.—I. Polynesian, Papuan, Australian, Patagonian, Obongo Dwarf, Yacoots, &c.
II. Caffre, Hottentot, Bushman.
III. Ethiopian, Guinea, Sengambia, Mozambique.

IV. Red.—Carib, Mohawk, Senecas, Chippeways, &c. &c.

V. Brown.—Peruvian, Mexican, Egyptian, Phœnician, Hindoo, Moor.

VI. Yellow.—Mongol, Chinese, Japanese, Malay, Eskimo, Fins, Laps, Basques.

VII. White.—Celt, Scandinavian, Norse, Teuton, Sclavonic, Scythic, Turk, Hun, Tartar.

Sabbatic Adam.

On the 7th Creative Day.—Gen. ii. 7–22.

Cain.—Armenian, Arab.

Seth.—Chaldean, Hebrew, Abyssinian.

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ORDINARY MEETING, May 3, 1869.

The Rev. W. Mitchell, M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were confirmed, and the following Elections were announced :—

Members :—The Right Rev. the Lord Bishop of Derry and Raphoe, The Palace, Derry ; W. Shepherd Allen, Esq., M.P., Reform Club ; G. M. Kiell, Esq., 8, Kensington Park Gardens ; Nehemiah Learoyd, Esq., 17, Finchley Road.

Second-class Associate :—Rev. C. F. S. Money, Lewisham.

The Rev. H. Moule then read the following paper :—

MORE THAN ONE UNIVERSAL DELUGE RECORDED IN THE SCRIPTURES. *By the Rev.* Henry Moule, M.A., *Vicar of Fordington, Mem. Vict. Inst.*

A FEW words on the nature of the authority which I attach to Scripture in the matter before us may be necessary, and will not, I trust, be out of place. By one who for more than fifty years has believed the Canonical books of the Old and New Testament to have been infallibly inspired by the one Eternal God, the statements contained in those books respecting the nature of that God, of His works, or of His dealings with man, can never be regarded as the mere opinions or theories of their several human authors. They are to him the revelations of God. To such a faith the first two chapters of Genesis, for instance, set forth not the Cosmogony of Moses, but the record given by Jehovah of His own creation and of one particular arrangement of that portion of Creation included in this earth. And, if thus given of God, such a record cannot be either trivial or without purpose. It cannot be mere legend, nor myth, nor conjecture. It must be truth—and truth which, in some way and at some period of his history, must to man be important and profitable. That Scripture was not intended to teach science or history is, in

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the ordinary sense of those words, true enough. If, however, in the first eleven chapters of Genesis (to say nothing here of other portions), if, in the very commencement of this wondrous revelation, to which, moreover, as that revelation proceeds, continual reference is made, the subjects are mainly physical and historical, surely so much of science and history as this was intended for man's instruction. If, again, the Author of the works of creation and providence, and the Author of the records of those works contained in the Holy Scriptures be the same All-wise and unerring God, no real variance can exist between the two. Between misconception and mere theory on one side, and truth on the other, or between misinterpretation and mistake on the side of Scripture and fact on the side of science, or between misconception there and misinterpretation here, there can scarcely fail to be opposition. But between the works and dealings of God, and His own record of them, there can be none. And let me be allowed to observe that the liability to misinterpret Scripture and the liability to misconceive the laws of nature appear to me nearly equal. For just as there are certain powers of mind, and these the gift of God, without which a man, whatever may be his talents of another kind, cannot fairly grasp any one portion of the system of nature, so there is a gift of that same God, the possession of which is necessary in order rightly to understand on any subject the true bearing and reach of Scripture. As reasonably may a man expect, by hammering one or two rocks, or by the possession of a few pebbles, to take in the whole science of geology, as to find in a few detached texts the true teaching on any subject of the word of God. On those subjects of which I am speaking there is in both records an analogy which must be carefully studied. They who would not misconceive the one, nor misinterpret the other, must possess a capability of comparing things that differ; and they must be careful to do this.

One word more on this subject. Both in natural science and in Scripture there is a class of facts and truths, which, from the first appearance of these records, has been patent to the most unlearned. Such are those which in science relate to the life of the body, and which in Scripture relate to spiritual and eternal life. While in both there is another class, teaching or illustrating the nature of God and of His works, which, though obscure at first, becomes clear and evident in the lapse of time. To this latter order I consider those to belong of which I now proceed to speak. In doing so I turn for the present from direct history to a passage in the 104th Psalm. And in justice to my argument I may be allowed to observe

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that on the Psalms generally the Lord Jesus Christ Himself has set His stamp of infallible inspiration. While, to the reality and truth of the statements in this particular Psalm, the author of the Epistle to the Hebrews has given direct testimony, in that he cites from it words setting forth the nature of angels. I take it up, therefore, as the production of a man not only of high mental power, but endowed with supernatural intelligence, and possessed of supernatural information. In it he expresses in a solemn act of adoration his deep sense of the majesty and glory of Jehovah as exhibited in His works of creation and providence. Words uttered by such a man under such circumstances, and written down under the teaching of the Spirit, cannot fairly be regarded as a mere poetical effusion. However figurative some of the expressions, and however beautiful the poetry of the whole, we cannot justly suppose the descriptions to be either imaginary or mistaken. He speaks of realities—of things that he knew to be true. He glorifies God for what that God had actually done.

Now, having stated in the fifth verse the creation of the earth, he, in the four following verses, speaks of two great works wrought on this earth so created, or rather of two providential arrangements of its surface. First, at some undefined period after its creation, Jehovah covered the earth with the deep as with a garment, and that to such an extent that the waters stood above the mountains. Then, at a period also undefined, but subsequent to the former, the Psalmist, in language partly figurative and partly literal, states that at the word of Jehovah the earth, previously so covered with water, was uncovered, and the dry land appeared. Through the elevation of the mountains and the depression of the valleys the surplus waters were drawn off to the place which Jehovah had founded for them. There a bound was set on them, "that they might not pass over, neither turn again to cover the earth."

Now, it cannot be gainsaid that the statement here is, that at some period of its history the whole earth was covered with water, and that these waters were partly disposed of in reservoirs within the earth. A reference to other Psalms, and to one or two other Scriptures, further develops those facts or arrangements, and serves to identify, to a certain extent, the period of their occurrence. In Psalms cxxxvi. and xxiv. we find the earth spoken of as stretched out *above* the waters; as founded upon the seas and established on the floods. In Psalm xxxiii. 7, Jehovah is said to "gather the waters of the sea together as a heap, and to lay up the depth in storehouses." In Prov. viii. 22–29 are the following re-

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markable statements. Wisdom, speaking, says—"I was set up from everlasting, from the beginning, or ever the earth was. When there were *no depths* I was brought forth; when there were no fountains abounding with water. . . . . When He prepared the heavens, I was there; when He set a compass upon the face of the *depth;* when He established the clouds above; when He strengthened *the fountains of the deep;* when He gave to the sea its decree that the waters should not pass His commandment; when He appointed the foundations of the earth," &c.

In these words of Wisdom there is—First, a distinct reference to the arrangement of the firmament or heavens, by which the first great separation of the waters was effected, viz., into the waters above and the waters below the firmament. There is, secondly, in them, and in the context, the gathering of the waters into one place, and the appearing of the dry land. And, thirdly, in this one place of the waters there appears to be a further distinction between the depths, on the face of which a compass was set, and "the fountains of the deep." These fountains clearly correspond with "the storehouses of the depth" (Psalm xxxiii. 7), and with the place founded for the deep (Psalm civ. 8), a place on which bounds are set, that those waters "turn not again to cover the earth."

In the Book of Job, Jehovah Himself speaks; and surely we are not to look for legend or conjecture or mistake here. In immediate connection again with the foundation of the earth, and yet as a work separate and distinct from it, He says (Job xxxviii. 8–11), "Or who shut up the sea with doors *when it brake forth as if it had issued out of the womb?* When I made the cloud the garment thereof, and thick darkness the swaddling-band for it, and brake up my decreed place, and set bars and doors, and said, 'Hitherto shalt thou come, but no further; and here shall thy proud waves be stayed.'" Now this clearly refers to a period when the deep covered the earth, and when darkness covered the face of the deep. It as clearly intimates that this was not the original or normal state of the earth. Here, as in Psalm civ., it is evident that if the Lord "covered the earth with the deep as with a garment," there must have been the earth to be covered. If "the sea brake forth as if it had issued out of the womb," there previously existed those inner recesses from which it so brake forth. Into those recesses it is here stated, as in Psalm civ., to have been driven back; and on "the decreed place," broken up for it, "bars and doors" are stated to have been set, so that without the special interference of Him who set those bounds, the sea should

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ever be kept within them and never through the forcing of these bars turn again to cover the earth. Now, to say the least, there is between the statements in all these passages a very remarkable agreement. We might say, so far as the several human authors are concerned, there is in them an undesigned coincidence. And there can be no just ground for the supposition that any one of these writers, thus agreeing together in their treatment of the same subject, expresses in his particular statement anything that is not fact and truth.

All this, however, becomes clearer and more certain, on a comparison of the passages already quoted with the brief history contained in the first ten verses of the first chapter of Genesis. To speak more particularly, in the second of these verses is set forth the occurrence, and in the ninth and tenth verses the removal, of this, which I will now venture to style the (or, if you please, a) pre-Adamite deluge. In order, however, to establish the fact that the second verse describes, not a chaotic and imperfect creation, but a wasting and devastating deluge spread over the earth, previously created by Him whose works are perfect, I must be allowed to give a brief exposition of the first and second verses. In giving it, moreover, I shall be glad thus practically to enter my protest against the assertion that the clergy, as a body, teach their people that the heavens and the earth were created only six thousand or seven thousand years ago. And I would show cause for a contrary assertion, namely, that if they are engaged, as men ought to be, either in the daily contemplation of the depths of the wisdom and knowledge of the Creator, or in adoration, as they stand in His presence, of the glory of all His attributes, they cannot be either unwilling or afraid, according to their ability, to dive into the lowest depths of true science or to accompany it in its loftiest flights. In my proposed exposition I shall not refer to the Fathers, though for a portion of the view I am about to give I might gather from them considerable support. Neither will I derive my interpretation from heathen legends; nor will I attempt to force Scripture to bend to scientific theories. I will first give the meaning, which, with a little close attention and a comparison of them with other Scriptures, these verses may be seen to have, and then confirm that view with a very little Hebrew criticism. I take it for granted that in the first verse, under the term "the heavens and the earth," we are to include all created things, and all created beings. And so far the proposition is the same as that of St. John,—"All things were made by Him, and without

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Him was not anything made that was made;" and it agrees with St. Paul's statement,—"By Him were all things created that are in heaven and that are in earth, visible and invisible, whether they be thrones or dominions, or principalities or powers, all things were created by Him." So that in this proposition is included another; namely, that the God who created the heavens and the earth is the only Uncreated One. All other things and beings had a beginning; He had no beginning; He is "from everlasting." When, therefore, we turn our minds to the words "in the beginning," we must connect these not only with the creation but with the Creator; and as soon as we do this, we find it impossible to conceive that until six or seven thousand years ago there were in all the universe no created beings. We see, then, that the words "in the beginning," have, if I may so express it, a nearer connection with eternity than with our time, and that the creation of heaven and earth may date back farther than the wildest speculator on the age of the earth has ever imagined.

From this clear statement of the inspired writer that the earth as well as the heavens was created "in the beginning," I call your attention first to the statement at the close of the chapter, that "God saw every thing that He had made, and behold it was very good." His work is perfect. But could we say or think that the earth, if at its creation it was in a chaotic state, was "very good," or perfect? Could we consider it perfect when "without form and void, and when darkness was upon the face of the deep"? Clearly from the subsequent history it was not so. When created, however, it must have been perfect. The state or condition described by the words "without form and void," was a state or condition prior, indeed, to that to which the remainder of the history shows it to have been restored, but subsequent to its creation. The period between creation and that condition of desolation and destruction and darkness is by the sacred writer undefined. So also is the duration of that condition. One act alone marks its close—the brooding of the Spirit of God upon the face of the waters. I say its close, for in immediate succession to this the command was given, and light was created. Here, then, was a deluge, of the universality of which I conclude there can be in the mind of a believer in the Scriptures no doubt whatever. I must presently speak of its removal. But first my few promised words of Hebrew criticism. Had Moses intended to say that when the heavens and the earth were created the earth was without form and void, he would have omitted the substantive verb (and was, והיתה). An

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instance of this idiom immediately occurs—"And darkness upon the face of the deep." Had he wished to express the immediate or close connection of such a state with creation, he would have used what may be called the successional or connecting form of the verb ותהי; such as is employed throughout the chapter. For instance: "*And* God *said*, Let there be light, *and there was* light." No sooner, that is, had the Spirit brooded on the face of the waters, than God said, Let there be light; and no sooner had this command been given than it was obeyed—"He spake; and it was done." Dr. Pusey in a note to his preface on the Book of Daniel very truly observes, "Moses was directed to choose just that idiom which expresses a past time, anterior to what follows, but in no connection of time whatever with what precedes." To this I will only add a single passage, which, when fairly considered, however, is of itself conclusive on the point in question. The Lord Himself speaks thus by Isaiah (xlv. 18), "Thus saith the Lord that created the heavens; God Himself that formed the earth and made it, He established it, He created it *not in vain, He formed it to be inhabited.*" The word rendered "in vain" is the "to-hoo" of Genesis i. 2, which fairly expresses desolation. And the plain statement here, so exactly corresponding with all I have previously stated, is this,—that the earth did not so proceed in that state of desolation from its Creator's hands. Previous to such a state of things it had fulfilled His purpose. It had been inhabited. For how long a period, I repeat, we are not told. But at length, whether for the sin of its then inhabitants, or for whatever cause, desolation and destruction came upon it. "The earth was (or became) without form and void;" the deep covered it; and darkness was upon the face of these covering waters; until at length, at the close of an unknown period, the earth was restored in the way described (Gen. i.) to light and life, and order and beauty.

And if, in the place of the fable of an original chaos or of theories not less fabulous, this fact of restoration be received, we through it perceive something of what was the previous state of things. At all events, a little reflection will lead us to a very important point in my argument—the sources of the waters which during that deluge so covered the earth. In the work of restoration a firmament is formed to sustain that portion; here styled "the waters that are above the firmament." This, to my mind, especially if taken in connection with the passages from Job, the Proverbs, and the Psalms, points to the previous existence of such a firmament. A portion of those waters had previously been sustained, as sub-

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sequently in the atmosphere. And when the period of desolation arrived, the retentive power of that atmosphere being at God's command withdrawn, all of that portion would, in rain and by waterspouts, descend to the earth. Then, as to the waters which after the removal of those above the heavens, still so covered the earth that they stood above the hills, if we only admit that at God's word they were so gathered into one place that the dry land appeared, we can scarcely fail to see that the only place for their so gathering together was not only in seas and oceans, but in recesses of the earth, in deep places beneath mountains and valleys, and it might be beneath the seas themselves. In the elevation of the mountains and the depression of valleys those treasure-houses for the deep were formed. From the position they severally occupy they are two; yet inasmuch as they form one body or mass of waters, they are one. Now, if into such recesses those waters must of necessity at God's bidding have returned, it must have been from them, or from similar recesses within the earth, that when the period of desolation commenced they issued forth. They are clearly the "fountains of the deep" (Prov. viii. 28), which God at the creation strengthened; on which, that is, both previous to the period of desolation and subsequently, He has set bolts and bars of restraint that they turn not again to cover the earth; but on the withdrawal of which "the waters issued forth as out of the womb."

PART II.

Before passing on to the second point in my proposition, allow me to summarize what I have thus said on the first.

It must be quite evident, I should think, to every one, that in Genesis ii. the sacred writer speaks not of a partial or local deluge, but of one which was universal,—*covering the whole earth.* The same is evident in the words of Psalm civ. 6: "Thou coveredst it (the earth) with the deep as with a garment, the *waters stood above the mountains.*" Again, it must be clear that after the removal into the atmosphere of that portion styled "the waters above the firmament," the remaining portion was still sufficient to cover the whole earth. The dry land did not appear until the waters under the heavens were gathered together into one place. And further, we have seen reason to conclude that this one place is partly beneath the surface of the sea, and partly beneath the dry land. Into the recesses and hollows beneath the latter, especially, the

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surplus waters were withdrawn—hollows formed by the elevation of mountains and the depression of valleys. And these, whether the same as existed previous to that period, when "the earth was without form and void," or whether then rearranged, were clearly the sources from which those waters, that then covered the earth, were made at God's command to flow. And who will venture to deny the possibility of the formation of such reservoirs within the globe when first created by God? Or who will assert that a natural law or order is, to infinite skill and power, impossible, according to which, by the earth's revolution on its axis at a certain velocity or at a certain angle, such a mass of waters should be retained in those reservoirs, and by a diminution of that velocity or a change of angle be set loose. For myself, however, I care not to know how or by what means these effects were produced. My one object hitherto has been to establish the fact that the Scriptures quoted declare, that in the several given but undefined periods, the waters of the earth had been so restrained; that they had been so sent forth over the face of the whole earth (Gen. i. 2, 9); and that they had been withdrawn and again restrained (Gen. i. 9–13).

Now in this same Book the inspired writer, in his description of the extent of the Noachian flood, and the depth of its waters, employs language as nearly as possible the same as that in which he and the other inspired writers describe the Pre-Adamite flood. God Himself is stated by him to have spoken to Noah thus: "I will destroy them (men) *with the earth.*" "Behold I, even I, do bring a flood of waters *upon the earth.*" . . . "For yet seven days and I will cause it to rain *upon the earth* forty days and forty nights." Then, in his narrative of the event so threatened, he employs, with respect to the extent of the Deluge and the depth of its waters, language so distinct and positive as this: "And the flood was forty days *upon the earth.* And the waters increased and bare up the ark, and it was lift up *above the earth.* And the waters prevailed and were increased greatly *upon the earth.*" *And the high hills that were under the whole heaven were covered*" (Gen. vii. 17–20). Again the withdrawal of the waters is related in such full and particular expressions as these:—"And the waters returned *from off the earth continually;* and after the end of the hundred and fifty days the waters were abated and the Ark rested in the seventh month on the seventeenth day of the month *on the mountains of Ararat.* And the waters decreased continually until the tenth month. In the tenth month, on the seventeenth day of the month, *were the tops of the mountains seen*" (Gen. viii. 3–5). Surely

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the inundation expressed in these several terms is co-extensive with that described by the Psalmist in Psalm civ. : "Thou coveredst it (the earth) with the deep as with a garment; the waters stood above the hills." Surely the expressions I have just now repeated are equivalent to those in Gen. i. 9,—"Let the waters *under the heaven* be gathered into one place, *and let the dry land appear.*" They are literal and exact, beyond question, in the one case; and they cannot, with any consistency, be regarded as figurative or exaggerated in the other. But further, we learn from the Book of Job (xxxviii. 8) that the pre-Adamite inundation was occasioned by the breaking forth of the waters of the earth from restraint; and to this same restraint they were driven back. And in the description of the rising and of the abating of the Noachian Flood, exactly the same ideas are presented to the mind. The sources from which the waters rise and descend, and to which they return, are evidently the same. Thus as to the rising of the waters,—"In the same day were all the fountains of the great deep broken up and the windows of heaven were opened." The latter of these, which might be called the floodgates or the cataracts of heaven, are clearly the waterspouts, caused by a vast and sudden depression of the atmosphere, the small drops or globules of vapour flowing together into a torrent. While "the fountains of the great deep" are evidently the same as those spoken of by Wisdom (Prov. viii. 27), which Jehovah strengthened, "when He established the clouds above, when He set a compass on the face of the depth and when He prepared the heavens." They are the reservoirs in which "He shut up the sea with doors when" (on that former occasion) "it brake forth as if it had issued out of the womb" (Job xxxviii. 8). With this last passage, expressing, as it does, restoration from a state of confusion into an original and normal state of order, how exactly does the language agree in which Moses describes the cessation of the Flood! (Gen. viii. 2)—"The fountains of the great deep and the windows of heaven were stopped, and the rain from heaven was stayed."

The whole narrative in the Book of Genesis, in either case, though brief, yet, when combined with the information afforded by the Book of Job, the Psalms, and the Proverbs, plainly shows that the sources of the two deluges were the same, viz., the waters sustained in the form of vapour in the atmosphere and those in the depths of the sea and in the recesses of the earth; the depth of the covering waters in both deluges was the same—the highest mountains were covered; no dry land appeared; and the extent was the

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same,—the waters covered the whole earth. And with this, so far as relates to that, with which we are now concerned—the universality of the Noachian Deluge—agree the words of Jehovah by the prophet Isaiah (liv. 6), "For this is as the waters of Noah unto me; for as I have sworn that the waters of Noah shall no more go *over the earth*, so have I sworn that I would not be wroth with thee, nor rebuke thee." The reference here is to Gen. ix. 15: "And I will remember My covenant, which is between Me and you and every living creature of all flesh, and the waters shall no more become a flood to destroy all flesh." But still more fully and exactly do the words of St. Peter (2 Pet. iii. 5–7) agree with what has been shown, both as to the extent of the Noachian Deluge and in part as to its sources: "By the word of God the heavens were of old, and the earth standing out of the water and in the water." Here, as it appears to me, is an evident reference to the formation of the firmament into and above which a portion of the waters was taken up (Gen. i. 6, 7). Then there is a still clearer reference to the gathering together of the waters into one place, so that the dry land appeared (Gen. i. 9, 10). Then it is added, "Whereby," that is, by which water (both that out of which, and that in which, the earth stood), "*the world* that then was, being overflowed with water, *perished*. But the heavens and the earth, which are now, are kept in store, reserved unto fire against the day of judgment and perdition of ungodly men." If here the two expressions, "the world" and "the heavens and the earth," be taken together and compared with Gen. vi., vii., viii., they add the strongest testimony to the universality of the Noachian Deluge and of its desolating and destructive power. Both then and on the occasion described in Gen. i. 2, "the earth," because of the waters, "was without form and void." To use the language of a prophet, foretelling the threatened destruction of Tyre (Ezekiel xxvi. 19), when Jehovah brought up the deep upon it and great waters covered it, the earth was made desolate.

The terms again in which the destruction caused by the Noachian Deluge is expressed confirm the view thus taken of those which set forth its extent: "And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man: all in whose nostrils was the breath of life, of all that was in the dry land, died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and the creeping things, and the fowl of the heaven; and they were destroyed from the

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earth: and Noah only remained alive, and they that were with him in the Ark." This follows the statement that "all the high hills *under the whole heaven were covered*" (Gen. vii. 19, 20). And it is only consistent both with this language and with the fact described, that we should interpret these statements of entire destruction literally. Such interpretation, moreover, is fully confirmed by the two following passages from St. Peter's second Epistle, "And *spared not the old world;* but spared Noah, the eighth person, a preacher of righteousness, bringing in the flood upon *the world* of the ungodly." Again, "*The world* that then was, being overflowed with water, *perished.*" The destruction in all these passages is co-extensive with the Deluge. In neither class of passages, whether taken separately or taken together, is there the slightest ground for the limitation of the universality of the expressions employed.

PART III.

It will doubtless have been observed that my argument has been limited to the extent of the two deluges, to the sources or reservoirs of their waters, and to the destruction of life occasioned by the latter. No allusion has been made to the Scripture statements respecting the extent to which animal life is stated by Moses to have been preserved from that destruction. I have considered that these two questions of universality demand a separate investigation. Difficulties which, when confusedly thrown together, appear impossibilities, will generally be overcome if disentangled and taken in detail. If the Scriptures be correct and true in the record of the Deluge, they cannot contain impossibilities in the narrative of the Ark. That which I have shown to be the correct view of the Scripture statements respecting creation, and respecting these two deluges, is a sufficient reply to all objections against the Scripture narrative drawn from the vast periods of time required both for the formation of the various strata in the crust of the earth, and for various and successive disruptions and upheavings. In the period, illimitable by us, between the act of creation and the occasion of the earth becoming without form and void, and again in the undefined duration of that state of convulsion, there surely is ample space for the production of all those phenomena. And more than this. In the record of two deluges, occurring at the nearer approach to us of a succession of countless ages, we may see, as it seems to me, the probability of a vast series of such convulsions

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occurring in an appointed order. We may thus see the probability (which, to the believer in the inspiration of Scripture, becomes a certainty) that the vast upheavings of the Alps, the Andes, and the Himalayas, for instance, occurred not confusedly nor by chance, nor by undirected force, but according to law and order, instituted by the Eternal, the Omniscient, the Almighty God. And is it to wander too far into the region of conjecture to suppose that in the chemical action, in the flowing, and in the vast power of the subterranean waters, so revealed to us in Scripture, may be seen the true explanation of many a natural phenomenon? Is it not in them that we are to find the true laboratory in which our limestone rocks and our deeply mysterious chalk cliffs were formed? Can we not see in them the sources of fresh springs and salt springs; and, when they come into close contact with the masses of fire within the earth, can we not see the sources of hot springs and the origin of salt rocks? Once more, may we not, in time, be able to trace to them the cause of that gradual upheaving of the earth's surface, often as mysterious as sudden disruption?

But I must check myself, and turn to the question before me, the extent to which in the Ark life was preserved. I would not on any account close my eyes to the geological truth that in far-distant periods the distribution of animal life was similar to that now existing. Nor would I evade the question: "Does Moses, in his statement that every kind of beast and bird and fowl and creeping thing was taken into the Ark by Noah, include the creatures indigenous to New Zealand and Australia and America? You take the expressions literally, which set forth the universality of the Deluge; do you put no limit on these?" And in reply to this I would first observe that, from the dimensions of the Ark and from the exact detail of the narrative, the number and variety of creatures must have been very great. Then, having myself assuredly gathered from the Scriptures that man was created not a savage, but a civilized being, and seeing unmistakable indications of a high state of civilization and of a very large population in the old world, I can see no difficulty in such a gathering having been effected during a period of 120 years, and by one, who must have possessed vast influence of a certain kind, and no little wealth.

The observation, however, often loosely made, is strictly true, that a limitation must not unfrequently be placed on these universal expressions of Scripture, such as "all men," "every man," the world," &c. Such limitation, however, is to be set not by the science, the reasoning, the fancy, nor the fears of unin-

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spired men, but by the inspired authors themselves; and it is to be gathered from a fair consideration of the passage in question, or from a fair comparison of Scripture with Scripture. Here is an instance: St. John says of Christ, "That was the true light which lighteth every man that cometh into the world." No expression could be more universal. Yet in the very same chapter he says: "The light shineth in darkness, and the darkness comprehended it not;" thus excluding many from the possession of that light. And afterwards the Lord Jesus Himself says, "I am come a light into the world, that whosoever believeth in Me should not abide in darkness;" thus limiting the gift to believers.

In the same manner the language of Moses, taken by itself, is thus full and universal: "Of clean beasts, and of beasts that are not clean, and of fowls, and of everything that creepeth upon the earth, there went in two and two unto Noah into the Ark, the male and female, as God had commanded Noah" (Gen. vii. 8, 9). And of this apparent universality some have attempted to prove the possibility, and some the impossibility. On a little consideration, however, a limitation is evidently placed on it by the inspired writer himself. For, first, the *distinction between clean and unclean beasts* seems to point to those animals of the earth, amongst which he knew such a distinction to have been instituted by God. And in neither class, in the full directions subsequently given to Moses, do we find either the kangaroo or the ant-eater,—creatures which have presented to many minds such mountains of difficulty.

The clue to the difficulty, however, appears to me to be here. We must take together the numbers of each kind of bird or beast to be preserved, and the directions for the provision of food for these creatures during a whole year. The numbers were fourteen of each clean, and two of each unclean kind. The provision is thus stated:—"And take thou unto thee of all food that is eaten; and thou shalt gather it unto thee, and it shall be for food for thee and for them." Now in the first place, animal food does not appear to have been permitted to man previous to the Flood; and in the next place there is here evidently no provision for carnivorous creatures. The fourteen clean beasts and the two unclean, would not have satisfied the carnivorous animals during a whole year. Besides, these were not intended for food for them, but to keep seed alive on the earth. If, then, food was required and food was provided for all, and for carnivorous animals none was provided, a limitation to this extent is at once set on the universality of the expression: such animals

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were not included in the Ark. And if a limitation thus far be evident, then if we take into account the distinction between the clean and the unclean, there is no difficulty in the exclusion of creatures inhabiting the remote parts of the earth. There is nothing unscriptural in limiting the beasts and birds and creeping things admitted into the Ark to those inhabiting that portion of the earth in which Noah dwelt before the Flood, and to which the Ark would for that reason return. We may limit them still further to such among these, as not only for sacrifice or for food or as beasts of burden, but in the variety of God's providential arrangements are serviceable to man. Such a limitation is consistent both with the narrative and with the general usage of Scripture. The limitation of the Deluge to only a portion of the earth is consistent with neither.

But if, then, a vast number of animals had no representatives in the Ark, by which their several species might be continued on the earth, in what way are we to account for their subsequent existence? I reply that almost every kind of fish, through the mingling of the salt and fresh waters, must have died. Every kind of tree also and plant, "whose seed was in itself upon the earth," must have been destroyed. In these cases, then, there must have been, after the subsidence of the waters, reproduction, or restoration of life, with perhaps some modifications. According to the Scriptures, there was creation after the pre-Adamite deluge. What is there in Scripture to contradict the idea of something similar to a certain extent after the Noachian Deluge? I can see nothing; while the several considerations above adduced tend greatly to support it.

To that support, although my paper has already been too long, I must venture to add another, inasmuch as it in my opinion greatly confirms not only this last, but most of the details which I have given of the brief Scripture history of the Creation and of the pre-Adamite and Noachian Deluges. It is that which is to be drawn from the clearly-connected typical teaching, afforded by those several details in that connection with each other, in which I have shown that they stand. Such teaching, set forth by inspired Apostles, and held with varying clearness and correctness in every age of the Church, differs from that of mere figure, or fable, or miracle, in that it rests on reality and fact, whether of person, or event, or course of events, or of divinely-appointed rite and ceremony. It is to be discovered also in such facts and realities, not by hasty guesses nor by efforts of the imagination, but either through direct Scripture revelation, or by a careful comparison of any

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type or course of typical teaching with the analogy of Christian doctrine. Whenever the teaching is correct and true, it fits in with an exactness which cannot be accidental. And when faith and intelligence are thus satisfied, the fullest confirmation is afforded both to the truth and reality of the type and to the truth and reality of that which is typified. There is in it all that force of undesigned coincidence which forbids the idea of chance, or of unreality, or of untruth.

Thus, then, runs the parallel. In the beginning God created the heaven and the earth: a perfect work. He created man upright in His own image: a perfect work also. After a time the earth fell into a state of desolation and darkness and death. From his state of uprightness man fell into a state termed a "death of trespasses and sins." Darkness filled every soul. "Darkness covered the earth and gross darkness the people." "Death reigned over all."

The state of desolation and darkness was closed by the Spirit of God moving upon or brooding over the face of the waters. And none can enter into the kingdom of God,—none, that is, can pass from death unto life, except he be born again of water and of the Spirit.

The imparting of the life-giving energy of the Spirit of God was immediately followed by the command, "Let there be light." And that was no sooner given than "light was." St. Paul, pointing to this very fact, says,—"God, who commanded the light to shine out of darkness, hath shined in our hearts, to give us the light of the knowledge of God in the face of Jesus Christ."

In that restoration of the earth God did not entirely dispel the darkness. With the light of day the darkness of night continued to alternate. So in the regenerate and enlightened soul the heart is renewed, but corruption remains; and the darkness of doubt will ever mingle with the light of faith.

I might easily follow the particulars of these types through the whole history of the restoration of the earth, and in that of the creation of man as it is contained in the first two chapters of Genesis. But I must pass on to one or two of the instances of this teaching in the narrative of the Noachian Deluge. This in the Scriptures is clearly regarded as a type of the coming destruction of the earth by fire. Now, into the Ark, prepared by the believing patriarch, he and his family were received, and, together with the clean and unclean animals, gathered there by them, were saved.

The Holy Spirit taught St. Peter (Acts x.) that the gathering together of all manner of clean and unclean animals (limited however to such, be it observed, as he might kill and

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eat) typified the union of both Jews and Gentiles within the Church of Christ. Can there, then, be anything strained in the idea that in the Ark and its inmates are typified Christ and His Church, or the company of believing people gathered from Jew and Gentile alike?

According to the view which I have stated above, no lion nor any ravenous beast was admitted into the Ark. Such animals are elsewhere used as figures of the enemies of God. Accordingly we find it written that "no murderer hath eternal life;" "the unrighteous shall not inherit the kingdom of God."

In the universal destruction of all living creatures not admitted into the Ark may clearly be seen the death, both spiritual and literal, which through the entrance of sin into the world has passed upon all men. "In Adam all die." And in that reproduction or renewal of vegetable and animal life, including the carnivora, what a picture-prophecy (for such a type is) may be seen of the resurrection both of the just and also of the unjust!

Now these are only a very few specimens from a certain stratum of Divine truth. But few as they are, they of themselves utter a voice far clearer than may be gathered from specimens from a literal rock as to probable facts and probable periods. Connect them however with similar specimens from the same stratum, and extend here your analogical reasoning, as you do with respect to geological formations; add to it moreover (as in geology you cannot) the few clear facts of history, and you get, as I just now stated, both as to the fact or facts which typify, and the truths and events typified, instead of mere probability and theory, positive, certain truth.

The CHAIRMAN.—I am sure we shall all be glad to return our thanks to Mr. Moule for his very remarkable paper, which I hope will lead to a good discussion. We must all feel indebted to him for the great care with which he has collected together passages of Scripture of the greatest possible importance on this subject. I now invite discussion.

Rev. J. H. TITCOMB.—I have heard Mr. Moule's paper with considerable interest, and though I cannot say that I agree with it in the main, yet, for that very reason I wish to offer a few remarks upon it by way of opening the discussion. It appears to me that while there is much that is valuable in the line of thought through which he has passed our minds yet still there is much which leaves room for divergence of opinion, both from a scientific and a religious point of view. Speaking of the paper generally, I would say that its science is founded upon theology, which I think is always more or less a mistake; while its theology, so far as it bears upon science, is founded upon private interpretations of Scripture—at least, so it seems to me. With reference to the first part of the paper, as to the universality of some

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primeval and pre-Adamic deluge, there would be no difficulty in allowing twenty of such deluges in those geological epochs within that portion of illimitable time which Mr. Moule has called attention to. The cataclysms and vast changes upon the earth in those geological epochs are probably beyond dispute, and therefore that that which is depicted in the 2nd verse of the first chapter of Genesis should have been pointedly referred to by the Divine penman, Moses, as that which preceded the six days of creation, is not to be wondered at. But I cannot help thinking that the passages from the Book of Job and the Psalms are rather hardly pressed. Viewed as a matter of scholastic and theological interpretation, there is too much hard pressing of poetry and metaphor into scientific and dogmatic statement in Mr. Moule's paper. I do not know whether you felt this generally, but it seemed to me that a rather rigid pressure was put on the poetic inspiration of Job and David in these Divine records, and that they were being pressed scientifically beyond their proper scope. But I will pass now to another point. I, for one, have long been impressed with the conviction, apart from the scientific merits of the question, that the Scriptures do not require us to believe in the universality of the Noachian deluge. I cannot see any weight in the arguments which have been brought forward upon that point. Those arguments have been brought before us over and over again, but I must confess that the calmest and most reverential investigation of the Word of God—and I speak as a clergyman—leads me to an opposite view. I cannot but remember that passage in St. Paul's Epistle to the Colossians, in which St. Paul uses language in every respect as full and unreserved and unlimited as Moses, when he says, "The Gospel was preached to every creature under the whole Heaven." Just in the same way we are told that the mountains under the whole of the heavens were covered with water. We must take it that the language of the Scriptures is often only partial and limited in its application, and there is not the slightest irreverence in taking it so. I will not refer to that other text which declares that all the world went up to be taxed, because that one from the Epistle to the Colossians is unanswerable, both showing that from the New Testament point of view there was the same line of thought prevailing as in the Old Testament. If science tells me that the Deluge was not universal, still I maintain that the Word of God is as inspired and as true and as accurate as ever to my mind. When we speak of things universal, but limit them to special circumstances, our words have no longer that wide signification which originally belonged to them. Even Stillingfleet, 200 years ago, and in an age long before theology was invaded by the theories which we have now, said distinctly in his *Origines Sacræ*, that he believed that the Deluge was not universal, and his argument was this:—(*to the Chairman*) I see you have Stillingfleet there, and I am quite willing to be brought to book for what I say, though it is many years since I read him; his argument was this—that it is in the nature of God's attributes and God's moral government, not only never to work a miracle without necessity, but never, as a God of love and benevolence, to destroy life without necessity. Therefore Stillingfleet says that as in all probability the human

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population of the globe was not co-extensive with the surface of the globe at that period, and as the Deluge was instituted simply for the purpose of destroying mankind, it follows that those portions of the entire creation which were outlying the area occupied by men would not be destroyed, on the principle of Divine beneficence, if it could be avoided ; and that the idea of a perpetual succession of miracles so enormous as those which must be demanded by a universal deluge (and geology has proved them still greater than they were thought to be in the days of Stillingfleet), made the universality of the Deluge a thing which was thoroughly improbable. Now, if Stillingfleet held that view, and if science and geology in our own day confirm it, and if such good Christian men and able authorities as Dr. Pye Smith and others hold it, there can be no objection to our holding it. Then there is another topic upon which Mr. Moule has touched with regard to the animals within the Ark. I think myself that according to the Mosaic theory the polar bears would be unclean animals. It has been very properly pointed out that it would have required a vast number of years to gather animals from every part of the world into the Ark, but much less time would be necessary to collect animals from a small geographical area ; and, in my view, all that the story goes to show is, that the animals preserved in the Ark were only those which belonged to the district over which the Deluge extended. The whole of the argument is lost and obliterated if we do not suppose that all the animals within the area of the Deluge were preserved by twos or by sevens, clean and unclean, for the purpose of preserving them ; and that order was clearly given by God to avoid the necessity of a second creation. Mr. Moule's paper, however, seems to imply that that was not so, and that there was a gigantic re-creation of the animals which were submerged and destroyed, and that the only reason for some of them being put in the Ark was that they might be preserved for sacrifice and food during the continuance of the Flood——

Rev. H. Moule.—No, no.

The Chairman.—Mr. Moule said nothing of that sort.

Mr. Titcomb.—Then that is my mistake. It would be unfair to press the argument about such a series of stupendous miracles, and the polar bears being kept in the Ark, if Mr. Moule opposes the notion that they were brought in ; but I think the whole bearing of the narrative is that the animals were taken into the Ark to preserve them, because otherwise they would have been destroyed. It seems to imply that as all mankind were destroyed so all beasts were destroyed, and that as man was taken into the Ark as a type of his race for preservation and reproduction, so twos and sevens of the animals were taken in as types of their races for the same purpose, and to avoid the necessity for re-creation. The theory of new creations is one upon which Scripture is utterly silent, and we might almost appear to be irreverent to the word of God by believing in it.

Mr. Reddie.—There are one or two obscurities in this paper which I should like to have explained. The first is Mr. Moule's theory of a previous creation before the creation of light. I cannot understand how the world could be

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anything else than "without form and void," when without light, and without the created beings which the author assumes are included in the words, "in the beginning God created the heavens and the earth." He says that that includes all created beings, and even including men, as I understand him; but he afterwards speaks of the creation of light subsequent to the destruction of that world. But how can he realize a living world existing in total darkness? What created beings could live in it? Some explanation on that point seems required to enable us even to understand the theory he holds. With regard to the meaning of the words *thohu* and *bohu*, we have had that question discussed on two occasions before. In the 10th number of our *Journal of Transactions* we find Mr. Warington objecting to the rendering put forward in Dr. Baylee's paper "On the Nature of Human Language." Mr. Warington, alluding to a passage in Isaiah, says :—

"In Isaiah the usage of the word *thohu* differs considerably, and looking through the latter half of the prophecy of Isaiah, which some think is by a different hand, I find six places in which *thohu* is used as meaning simply nothing,—nothingness, without the slightest trace of ruin. It also means empty, worthless."

On a more recent occasion, when Mr. Warington read his own very interesting paper "On the Biblical Cosmogony," he quoted, oddly enough, that very rendering given by Dr. Pusey in the preface to his work on the prophet Daniel; but it seems now as if we shall require to have not only an interpretation of Scripture, but an interpretation of Scripture interpreters! for Mr. Warington makes the words of Dr. Pusey to signify exactly the opposite to what Mr. Moule gives us as his reading of them. I rather think Mr. Warington's interpretation of the words is the sound one. But it is difficult to criticise the verbal accuracy of a paper when we have not that paper in print before us, owing, in this instance, to the fact that Mr. Moule was rather pressed for time, so that we could not have it printed this evening. Then, with regard to the supposed agreement with Mr. Moule's theory, of the allusions to the covering of the earth with the waters in the Psalms, in the Book of Job, and elsewhere, I think it is very likely that the language agrees perfectly with the description of a universal flood, because I think they do most probably allude to the flood of Noah, and not to any imagined previous deluge. I think that most people would be startled to find that more floods than one are spoken of in the Scriptures. Another weak point in the paper is that many of Mr. Moule's arguments rest on mere verbal expressions; as, for instance, where he considers that the words, "the heavens and the earth," do not include the water. If you consider that the words, "God created the heavens and the earth," in the first verse of Genesis, did not include the waters in a separate condition, as they now are in, but that the earth and waters were then in a state of mixture and confusion before ever being separated, or the earth as covered with the water, the whole is clear, and this new theory of a former flood disappears. Observe, too, there is no creation of the waters recorded at all, if "the earth" merely means the

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dry land, and not land and water in a state of chaos. I contend that the most obvious meaning is the most probable and accurate one. The "heavens" refers to the sky and all beyond, and "the earth" to the earth and waters together; and darkness then "was on the face of the deep." In confirmation of this, the context tells us of no creation of water afterwards, but only of "the waters" (assumed to exist) being gathered together in one place, so that the *dry* land, formerly covered or moist, then should appear. The world also was created, as a whole, in its elements and principles, but not in form —though of course it must have had some shape—for there could be no form in darkness. If you get rid of light, you get rid of "form" at once. I approach a discussion of an exegetical kind with some reluctance, both because I do not like much exegesis in our papers, and because I would fain speak with great deference in the presence of the clergy and of the author of the paper before us. But I am obliged to say that the very terms in which the Flood is first spoken of, "And behold I do bring a flood of waters upon the earth," seem to me to indicate that that was the first time this had been done, and that it was not a second flood. The second would have been as nothing to the first that took place, and still less to the series of floods which Mr. Moule seems to think occurred. I shall not, however, take up with that theory until I find that geology has given us substantial ground for holding it. With regard to the universality of the Noachian flood, there are, no doubt, great difficulties about it; and I must even say that I would much rather adopt the theory of a partial flood than the theory of Mr. Moule. I do not understand how any one can bring himself to believe that since the flood of Noah there has been a creation of wild beasts and other creatures; and indeed it is rather contrary to the whole theory and tone of Mr. Moule's paper to suppose that wild beasts could have been created as such. I prefer to hold what appears to be the more Scriptural view, that a state of savagery or wildness was introduced among the animals as a consequence of the fall. That much more accords with the theory of the creation and the fall of man, and the renewing of the earth and the restoring of man though Christ. We have St. Paul's allusion to "the whole creation groaning and travailing together in pain," evidently as a consequence of the fall. But we must take up that question hereafter, when we have a paper in reference to it, for it will not do to touch it merely incidentally. But there are great difficulties in dealing with a theory so perfectly novel as the one now before us; for this is the first time I ever heard of the waters covering the face of the earth being translated into meaning that there had been a previous deluge in a world of total darkness. The paper must be further considered carefully after we have the whole of the arguments before us in print, which I regret was not possible to-night.

Rev. C. A. Row.—I will not trespass long upon the meeting; but inasmuch as this paper is eminently theological, I cannot help expressing an opinion upon it. I think that as a mode of interpreting the holy Scriptures, it will hardly be supported by one theologian out of a hundred. The principles of interpretation which it puts forward are, I think, exceedingly dangerous

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principles, and they seem to assume one particular mode of inspiration. The paper not being printed, and therefore not having read it beforehand, however, the fault may be mine ; but as far as I have been able to follow it, I think its principles of interpretation are exceedingly dangerous. It mixes up one portion of the Scriptures with another, taking one passage from the Psalms, another from the Pentateuch, another from the New Testament, and so on. Mr. Reddie has referred to a passage in the New Testament which shows how difficult it is to attempt to analyze and make a careful exegesis. There are many eminent theologians who hold that the term "whole creation" in that passage applies only to the human race. Then take St. Peter, and his reference to the "whole world." If we take the *usus loquendi* of the New Testament, there is no doubt that the term "world" very frequently is applied in a decidedly limited sense. Mr. Titcomb quoted one remarkable instance ; and St. Paul told the Romans that their faith was heard throughout the whole world. But does any one tell me that in the year 58 the faith of the Christian Church was heard throughout the whole world? I think that to set up such an interpretation, so largely based upon theory, unless there is the strongest necessity on Scriptural grounds for it, is a very dangerous proceeding ; and, according to my view, it is far more likely to produce disbelief in the inspiration of the Scriptures than anything else. I therefore decidedly object to such a course. Then another serious question for us to consider is, the great and serious multiplication of miracles which it involves. Any one who knows the difficulties of the subject will admit that we should be very careful in ascribing miracles where the Scriptures do not positively say that they have been performed. There cannot be a doubt, as I said once before, that the New Testament does show a great economy of miracles ; and I cannot see what grounds I have, in order to support a theory of my own, for calling in an indefinite number of miracles, and palming them off on either the New or the Old Testament. I read a large number of rationalistic and infidel works, and there is nothing more dangerous, with regard to the spread of such literature and such opinions, than the needless calling in of miracles in places where the Scriptures do not expressly mention them. I would not even hint at miracles unless the Scriptures made it absolutely necessary ; and I would not assume them where the Scriptures say nothing whatever upon the subject.

The CHAIRMAN.—In summing up this discussion, I can only say that I differ altogether from the first part of the paper, but I agree entirely with the universality of the waters covering the earth. Every scientific fact points to that great truth : that which is described in Scripture is also marked on God's works in the earth. I cannot see any foundation from what we read in the records furnished by our geological strata for those frequent deluges or creations which was the favourite theory of a few years back, but which the progress of science is now eliminating from science in the opinions of the men who themselves brought it forward as once the most probable theory of the earth's history ; but, setting that aside, I cannot help feeling that I thoroughly sympathize with Mr. Moule in his assertion

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of the universality of the Noachian deluge. The more we consider true science, and the more fairly we interpret Scripture, the more we must be brought to the conclusion that the Noachian deluge was universal. In the first place, all theologians are agreed on one point, that the Deluge was as universal as the human race. No fair interpretation which you can give to the New Testament, and no fair interpretation which you can place upon the Old Testament, will lead you to any other doctrine than the universality of the destruction of the human race with the exception of Noah and his family. Now if you admit that the passages which you take from the Holy Scriptures prove the universality of the destruction of the human race, with the exception of those eight who survived in the Ark,—if you take the Holy Scriptures as bearing the interpretation of universality of that,—I claim the same universality of interpretation as to what is said to be the destruction of all flesh upon the earth. If you give a universal interpretation to the one, I think you are bound to give the same interpretation to the other; and if you talk of universality of the destruction of the human race, I believe you must at the same time admit the universality of the Deluge over the whole earth. In this way you get rid of all difficulty of exegesis and of interpretation by comparing other passages of Scripture where similar universal terms are used, but where the facts are so narrowed or where they are used in such a connection you cannot give a universal interpretation to them. But I would point out a great theological difficulty into which such an interpretation as that of Mr. Titcomb would lead us. If I am to say that the terms describing the destruction of all flesh are not universal, I must apply the same interpretation to the destruction of the human race. In that case we should have no answer to such a paper as the last one which was read in the Institute, and which received very little countenance from our members. I do not see how you are to answer those men who maintain the plurality of the human race, or how are you to maintain the universality of the destruction of the human race, if you are to use such an interpretation as this? You may then admit hundreds of other races besides the Adamic race; and when the authors of the New Testament speak of the universality of the destruction of the human race, you may place just such an interpretation upon that as leads you to interpret a partial deluge of the earth. Now let us go to the real facts——

Mr. Reddie.—Will you be good enough to explain why you maintain this ground? The human race were created in only one place or centre, whereas the animals, I suppose, were "brought forth" all over the world. I only ask for argument's sake, but why do you object to a deluge that would be universal as regards the human race, but which might not spread to Australia or to other countries where there were then no human beings? Why do you object to this—on your theory of the creation, I mean?

The Chairman.—I think that that is sufficiently clear in that portion of Stillingfleet where he maintains that it is not necessary to believe in a universal deluge. He meets that position by limiting the language of Scripture when it speaks of the destruction of all flesh on the earth. He says:—

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"I cannot see any urgent necessity from Scripture to assert that the Flood did spread itself over all the surface of the earth. That all mankind (those in the Ark excepted) were destroyed by it, is most certain according to the Scriptures. When the occasion of the Flood is thus expressed :—'And God saw that the wickedness of man was great upon earth, and that every imagination of the thoughts of his heart was only evil continually. And the Lord said, I will destroy man whom I have created from the face of the earth.'"

But that is not Stillingfleet's view ; he merely puts it as an assumption. He says that it is "not necessary" to maintain a universal deluge ; but upon this theory of a partial deluge he says, it would be sufficient for Scripture if you destroy, not Palestine only, but the whole continent of Asia. That is his point, and he puts a limited interpretation upon the words, remarking :—

"For it is said that all flesh died that moved upon the earth, both of fowl and of cattle and of beast and of every creeping thing that creepeth upon the earth, and every man."

And then he proceeds to show that that might have applied only to that part of the earth which men inhabited. But when you give a universal interpretation to every man, why do you limit it in the case of the other animals? I now go to what I consider to be the patent facts of science, and what are they? It is admitted that there is no mountain so high upon the earth that it does not contain evidence of having once been under water. That much is admitted. I will not say what are the different theories which have been attempted to be set up to account for this. I only deal with the facts, not with interpretations. We are told that we must not multiply miracles. Well, but what is a miracle? We put our own interpretation upon the word miracle, but when we get to the Bible that has a very different interpretation. A miracle is a work of God, and as much a part of God's law as any other work of creation. Man's very existence or vitality and God's keeping all things in the order in which they are kept are as much miracles as anything else——

Mr. Reddie.—No, no.

The Chairman.—A different kind of miracle, I grant you (hear, hear), but still a miracle. I say that science also comes in with its miracles, and requires as much from our faith as anything contained in the Bible. Look at the electric telegraph : is not that a great miracle? You suppose that all Europe was once at the bottom of a very deep sea, and then, by some means or other, was raised again to the top and was depressed again, and so on ; and if you multiply these things and believe the miracles of science, are you to have any difficulty in believing that one miracle which the Bible shows in the universality of the Noachian deluge? We have had a reference made to Dr. Pye Smith and his views. But why did he object to a universal deluge? Because he thought there was not water enough to cover the whole earth. But when he put forward that theory we had not plumbed the depth of our oceans. He did not know that they were far deeper than the height of our

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highest mountains. The Bible does not tell you that the Deluge was a miracle in a limited sense, but that it was God's work of destruction, like the curse that came upon the earth for man's sake. Was that great curse universal, or only partial, which came on account of man's disobedience? Did Australia or America escape? If you admit the universality of that first curse, what difficulty can you have in admitting the universality of that judgment or second curse? But let us come to what science shows us. I do not go into the scientific hypotheses, explaining the changes that have taken place—the great upheavals and depressions; but we can tell something of the terrific forces chained up in the depths of the earth. Look at the islands of the Azores. When you see those islands raised above the sea, and when you plumb the depths of the ocean, you may well ask what force and what power raised them up. What force and what power was that which even Darwin himself admits lifted up the Andes and 2,000 miles of land, not by a gradual process extending over 3,000 years, but in the course of one earthquake, and lifted them up eight feet? We find there are forces in nature quite capable of doing that which science tells us of, in showing that the Andes and the Himalayas were once under water and are now above it. But science has failed to give us any satisfactory reason for their present position, unless you admit such a miracle and work of God as is implied in a universal deluge. Let us go to another fact. There is the science of ethnology, which teaches us that if you take the past history and tradition of mankind, they show that the human race everywhere have had impressed on them the tradition of a flood, universal so far as mankind were concerned. Tylor, in his History of Civilization, attempts to account in one way for the universality of that tradition by the fact of the people finding shells on the tops of their mountains. But examine their histories and traditions, and see how precisely they agree with the inspired record. See how Mexico gives you the tradition of a bird bearing a branch across the waters. All these things are impressed in a marvellous way upon the different peoples, and they corroborate each other in a marvellous way. I maintain that all true science—the science of history, the science of the natural history of mankind, the science of human tradition so far as it can be interpreted, and the science of geology in its true sense as the words spoken to us by the rocks of the earth—these things all bear testimony to a universal deluge——

Mr. Reddie.—But it will not do merely to say that the rocks have been covered with water, because they bear testimony that they were formed in water as strata. It will not do, therefore, to say merely that they have once been "covered" with water; and I feel so much the value of your remarks, that I should like you to be quite clear upon the grounds of your argument.

The Chairman.—But that is in my favour. No one will deny that the cretaceous strata and the nummulitic rocks of Egypt were under water. It is for you to account, if you can, for their being brought up without such force as would be sufficient to produce a deluge——

Mr. Titcomb.—I cannot but call attention to what our Chairman has said concerning the universal traditions of the Deluge. I have collected 200 or

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300 of them, and know them thoroughly well, and I can confirm all he has said. They exist with such minuteness of variation and with such circumstantiality of agreement, that they are really wonderful. But, *cui bono* the argument? It has no bearing on the question at all. These things can be accounted for from the facts of the case—that the eight souls who were saved as the originators of the new race went north, south, east, and west, and circulated the tradition of those records; and those records are the traditions of the family of eight, and are not to be accounted for in any other way.

Mr. REDDIE.—They certainly could not have been the traditions of the drowned inhabitants of the world. (Laughter.)

The CHAIRMAN.—The first part of my argument was that the terms of Genesis implied the universality of the destruction of the human race, and now I say that they also maintain the universality of the destruction of all living things in the same passage. When you interpret the destruction of all living things partially, then I say that others have a right to interpret the destruction of the human race partially——

Mr. TITCOMB.—That is not the point. You say that everybody in all parts of the earth had an evidence of the universality of the Flood from local facts instead of from tradition.

The CHAIRMAN.—You misunderstand me altogether. Tylor said that in his History of Civilization, and I was combating his views. Tylor attempted to account for the universality of the tradition, not from the universality of the destruction of the human race; but not admitting that at all, he thought the human race got that tradition from the universality of the local evidences of the Deluge, showing that all parts of the earth had been under water. I combated that by adducing what you have confirmed, that the traditions of the human race were so peculiar, and agreed, in the midst of certain diversities, so thoroughly in the main with what is stated in the Bible, as to prove that they all came from one central source. That was my point——

Mr. TITCOMB.—But that does not confirm your argument.

The CHAIRMAN.—Yes, in a certain sense it does. I now claim that, having shown the universality of the destruction of the human race, Tylor's argument entirely falls to the ground; and I now further claim the testimony of the rocks as to the universality of the Deluge——

Rev. E. HENSLOW.—It seems to me that if the rocks prove the universality of the Deluge, you confuse the element of time, because the rocks are of different epochs.

The CHAIRMAN.—I say that the progress of modern science is going to sweep these epochs away. I do not believe in them. Even Professor Huxley is beginning to find that the rocks give a very different testimony to what was supposed when men held the theory of a succession of creations. One of the very last things I heard from Professor Huxley at the Geological Society was in opposition to that theory; and he said that in the lowest rocks, and in the Silurian system, you might find as great a variety and as high a development as at the present time, for any evidence you have to the contrary. But now I want to show how dangerous it is to quote from memory. Stillingfleet

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takes hold of a certain objection urged against a universal flood, and goes on to say :—

"The only ground of questioning the possibility of such a flood as that which is related in Scripture hath been from hence: that some have supposed it impossible that all the water which is contained in the air, supposing it to fall down, should raise the surface of water upon the earth a foot and a half in height ; so that either new waters must be created to overflow the earth, or else there must be supposed a rarefaction of the water contained in the sea and all rivers, so that it must take up at least fifteen times the space that now it doth ; but then, they say, if the water had been thus rarefied, it could neither have destroyed man nor beast, neither could Noah's ark have been borne up by it any more than by liquid air. To this, therefore, I answer: first, I cannot see any urgent necessity from the Scripture to assert that the flood did spread itself over all the earth ; that all mankind (those in the ark excepted) were destroyed by it is most certain according to the Scriptures, when the occasion of the flood is thus expressed: 'And God saw that the wickedness of man,' &c."

Then he takes the destruction of animals, and says you have no necessity to admit more than that ; and then he goes on :—

"Secondly, suppose the flood to have been over the whole globe of the earth, yet there might have been water enough to have overwhelmed it to the height mentioned in Scripture."

And he goes on to show what are the arguments which prove that that was possible. But a little further on he says :—

"I come now, therefore, to the evidence of the truth and certainty——"

Of what ? Of a partial deluge ? No.

"Of this universal deluge, of which we have most clear and concurring testimonies of most ancient nations of the world"——

Mr. TITCOMB.—Universal as regards man.

The CHAIRMAN.—No ; as regards the destruction of all the animals. He says : "I am not afraid of admitting a universal deluge, though I can make you a present of a partial deluge if you like" ; and he then goes on to show the evidence upon which he rests his case. Now that shows the difficulty which often arises in partial quotations. But Mr. Henslow has reminded me that I am not following the text-books of geology as regards this matter. I know I am not ; but everybody knows that geology has completely outstripped its text-books. Any man who denied that would be laughed at as a man far behind his age. The text-books do not now come up to the theories maintained by the great authorities in the Geological Society, who do not see any necessity for admitting these successive creations. I think that when we begin to understand these things more we shall find that old Dr. Cockburn was not so far wrong as a scientific man when he maintained that all the phenomena presented to us by the strata might be perfectly accounted for by a universal deluge. I do not agree with Mr. Moule that he has proved the

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existence of a pre-Adamite flood ; indeed I do not think that that is at all necessary. You might call that multiplying miracles. But if we consider this subject, we find traces in the Holy Scriptures of a great curse falling on the earth. We find that when man fell, that creation which had been declared by God to be very good—the animals and trees which He had created perfect—received a curse for man. The earth was cursed for man's sake. Who can tell what cataclysms or terrific events were connected with that curse when man was turned out of Paradise ? But we have Scripture telling us of another curse. The earth was polluted by man far more than when Adam and Eve sinned and were cast out of Paradise. There is some mysterious union between man and the inferior creatures ; and that curse was so great from man's vileness that God in His wisdom allowed it to extend over the whole of creation, except those beings whom He saved in the Ark. But one thing has been lost sight of in these controversies with regard to not having a universal destruction of all living things. If we are to take a partial deluge, and only to submerge Asia, according to the principle which Stillingfleet mentions, where was the necessity for having such a number of animals in the Ark ? Where was the necessity for having an ark of such dimensions ? All the provision that would have been required was, that there should have been enough to sustain Noah and his family until the Ark was carried to those portions which were not submerged, and which would have been well supplied with animals and foliage. There was no necessity for the saving of such a number of animals. We are told that we must not multiply miracles, and that Scripture is provident of them. Now I deny that. It is true that in some portions of the history you go over long epochs and periods without a miracle ; but you come then to a break, and then there is a prodigality of miracles. It must have been a miracle in a universal deluge, or even in a deluge which extended only to Asia, which sustained the Ark on the water in the midst of such a terrific conflict. Submerge Asia now, if you could do it, and would not that produce a universal deluge ? We know what a sweeping deluge took place as the result of one little earthquake ; what, then, would be the effect of submerging a whole continent ? It is said that the Scriptures are so very provident of miracles, but just take the instance of the children of Israel in their passage from Egypt to the land of promise. Was there not a prodigality of miracles in the deliverance of those people ? Would not one sign have been enough ? Why did He multiply them if He is to be provident of miracles ? But no ; He determined to give the people such evidence of His power that they should not resist the belief or knowledge of that power of the One True God. Why did He lead His people through the Red Sea ? He could have carried them into the desert without that. Where was the necessity for such a miracle, if the Scriptures are provident of miracles ? Why were the children of Israel condemned to wander forty years in the desert ? Why were they not taken into a country where they could have grown their own corn ? Why were they fed with manna—angels' food ? Why did the fall of manna take place on every day except the Sabbath for forty years, and why

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was there a continual miracle in the cessation of the fall of manna on the seventh day? Come down to the time of our blessed Lord. How very few were the miracles throughout the prophetic period! Our blessed Lord Himself refers to that—to the *one* leper who was cleansed, and the *one* widow sustained. But was our blessed Lord cautious or sparing in the working of miracles? Were not His miracles of a character calculated to strike awe and reverence over all the world? But where was the necessity for such a miracle as cursing the barren fig-tree, and causing it to wither away? If your view is correct, no miracle should be wrought except for some high and extraordinary purpose! But the taking away of one or two miracles will not satisfy the sceptical spirit of the age. The men who object to one or two miracles deny the existence of miracles at all. They feel that if they admit one they might admit thousands. Take the Biblical account of the collection of the animals into the Ark. Was there no miracle in bringing all the clean and unclean animals together into the Ark? Do you suppose Noah went to bring them together—to tame all the wild animals and bring them in? We do not know enough of science to say that the animals which were taken into the Ark were not capable of producing all the varieties that we see now upon the earth, and to a certain limited extent I would go with Darwin's theory. We know man's power of multiplying apparent species—I do not say real species—and producing varieties of dogs, horses, pigeons, and other animals; but we do not know enough of the limitation of the law. We find that there is a law limiting variation in the propagation of animals, but we do not know how far it extends. For anything science shows to the contrary, we may account for all the various animals now distributed over the face of the earth from those species which were preserved in the Ark. Then we are told we multiply miracles for the dispersion of these animals; but the same power of God which brought those which were to be saved from all parts of the earth could distribute them again over the whole earth. And remember that we know very little of the power and rapidity with which the animal creation might increase and multiply when there is nothing to disturb their multiplication; but we do know that one little weed introduced here from America only a few years ago, has increased to such an extent as to become a pest, filling up all our canals; and that has been done within our own memory. We cannot say how rapidly the animals would increase and multiply after the earth had been delivered from the deluge.

Rev. H. Moule.—I have not much to say in reply to the observations which have been made, but I will first refer to Mr. Reddie's remarks as to the creation of light. I distinctly stated that the Scriptures appear to speak of the events after the period spoken of in the second verse of the first chapter of Genesis as a *restoration* of light and life, and order and beauty. Life had existed before; and, if so, light. Dr. Pusey has stated that the original words of the chapter admit the interpretation of an indefinite period from the beginning of creation to the period of confusion, thus giving a *carte blanche* on which scientific men might write anything they please. With regard to Mr. Titcomb's remarks, I do not think they have

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touched the subject of my paper. Mr. Row's comments have been somewhat severe as to the danger of such views as mine ; but all I can say is, that I have attempted simply to follow out the meaning of the Scriptures. The danger which Mr. Row spoke of, and Mr. Titcomb quite agreed with him, consists in attempting to interpret universal expressions too literally. Now I quite admit that such universal expressions as those gentlemen referred to are limited ; and I have admitted that over and over again. But what I contend is, that those expressions are not *always* limited, and that the passages which I brought forward from Job, the Proverbs, and the Psalms, contain, just as the first chapter of Genesis contains, reasons, which I am sure cannot be set aside, for the literal meaning of the universal expressions which they contain. I am sure that all danger arising from that source may be completely put aside. But another danger which Mr. Row seemed to fear was what he called the multiplication of miracles. I can scarcely add anything to what our chairman has said on this subject ; but if you admit the universality of the Deluge—call it miracle or call it what you will,—the necessity for the reproduction of vegetable life is as manifest as anything can be. No plant or tree could have existed for several months under water. There must have been new life given to them, and to a vast number at all events of the fishy tribe ; and what is there in going a step beyond that to admit that animal life might have been produced afresh ? I put this paper before you simply as what I have endeavoured to gather from Scripture ; and I must say that I have been for twenty years fully persuaded of this interpretation of the first and second chapters of Genesis. With regard to the passage from the 104th Psalm, I am sure it is impossible to interpret that with reference to the Deluge, because it refers to the time when God formed the heavens and the earth. But I shall be very glad if my paper, when printed by the Institute, should be left open for further discussion. I expected that great fault would be found with it, but I am as persuaded of the universality of the Deluge as I am of any truth with which I am acquainted ; and I am sure that that will be admitted when all the confusion which geologists have been making will be brought into order by the scientific declarations of the Scripture.

The meeting was then adjourned.

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NOTE (*See* pp. 121 and 231, *et seq.*).

THE ANIMALS TAKEN INTO NOAH'S ARK.

In discussing the foregoing paper, and also that of Mr. Davison, "On the Noachian Deluge" (page 121 *et seq.*, *ante*), there is an argument which might have been used, with reference to the animals taken into the Ark by Noah, which seems so obviously sound, now that it has occurred to me, that I cannot but feel astonished that, so far as I know, it has never been previously advanced. I venture to place it on record here, as it appears to clear away much difficulty that has naturally been felt, both as regards the sufficiency of the accommodation afforded by the Ark for so many animals, and also as regards the capture and housing of the wild animals, and the quantities of food that would be required for all.

It is simply this, that most probably, because most naturally, Noah would take with him, as far as possible, the *young* of all animals, and especially the cubs of wild beasts, instead of collecting the grown-up creatures. This supposition certainly clears away very many difficulties of the kind I have referred to; and, upon reflection, it seems that it almost needs must have been so; for it is well-nigh impossible to understand how either the grown-up wild animals, or many of the birds, could have been taken by Noah into the Ark in any other way.

In advancing this argument, however, I do not wish to recede from that urged by me, in discussing Mr. Davison's paper (p. 152, *ante*), as to the probable much smaller number of species (if species and not genera were taken) then than now; which argument, it will be observed (p. 259), is also used by Mr. Mitchell in discussing Mr. Moule's paper. But in using this argument, I beg leave emphatically once more to disclaim any adherence to Darwinism (see p. 161, *ante*). I do believe in variations in plants and animals (the existence of such variations it did not require Mr. Darwin to prove),—and I am not sure that there may not be a variation of their so-called species (but that Mr. Darwin himself does not claim yet to have proved); but, even if there were, it does not in the least follow, that there could be a further and unlimited variation, or any new development or transmutation of *genera*.—J. R., Ed.

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ORDINARY MEETING, May 10, 1869.

The Rev. W. Mitchell, M.A., Vice-President, in the Chair.

The Minutes of last Meeting were read and confirmed, and the following Election was announced :—

Member :—Rev. Payne Smith, D.D., Regius Professor of Divinity, and Canon of Christ Church, Oxford.

The presentation of the following works to the Library was also announced :—

"Discoveries in Science by the Medical Philosopher." By Sir G. Duncan Gibb, Bart., M.D. *From the Author.*

"Review of Dr. Candlish on Revelation." By P. McFarlane, Esq., M.V.I. *From the Author.*

The Rev. G. Henslow then read the following paper :—

ON CERTAIN ANALOGIES BETWEEN THE METHODS OF DEITY IN NATURE AND IN REVELATION.

By the Rev. G. Henslow, M.A., F.L.S. ; *Mem. Vict. Inst.*

PART I.

THAT Evolution, or Creation by Law, as it has been termed in the endeavour to account for the present existence and condition of Things, is by far the more probable method of Divine working than that expressed by the so-called "Special-Creative" hypothesis, few men of science will now deny.

That the doctrine has been suspected and ridiculed is no more than might be anticipated ; for all startling and new theories pass through the three stages of ridicule, examination, and acceptance, if found reconcilable with truth ; and evolution is now being rapidly transferred from the second to the third stage.

It will be out of place to enter into the many arguments

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which conspire to support the probability of evolution;* but it will be needful to allude to certain features only which bear upon the subject of this paper.

In the first place, then, I would lay down this proposition, which I think will be found of universal application,—that there is in all probability no such thing in this world as absolute perfection.

In stating this, I would observe that our ideas of perfection can only be relative. As we say, in speaking of intellectual and moral attributes, that perfection resides in the Deity alone, which may therefore represent the limit to which we are continually endeavouring to approach, but can never reach; so in the works of nature our conception of the perfect is never realized. Here and there individuals may appear to far outshine their like in beauty, symmetry, adaptations, &c., and to represent as nearly as may be possible our notion of perfection. But an observer cannot but admit such cases are comparatively few; and even these, when subjected to a rigid examination externally and internally, *i. e.* anatomically, are usually, if not always, found only relatively perfect. For, *e. g.*, when we examine into the structures of animals and plants, we find what affords one of the strongest arguments of evolution, namely, an abundance of rudimentary and useless organs.

The word "useless" is, of course, open to the usual charge that we have no right to call anything useless, for it may hereafter be shown to have some purpose of which at present we are ignorant. Now this, to be sure, appears a just objection; but, in reply, I would observe that the word useless, like perfection, is relative only; and in thus describing nature as never being absolutely perfect no irreverence is admitted, as I believe it to be the indirect result of God's will. In support of this view is the fact that these rudimentary organs are sometimes capable of development, and so of rendering active service, as in the case of the mammæ of the male sex; and the explanation of their existence is that they either represent organs once necessary, *i. e.* in their ancestors, but which organs are now superseded by new and equally admirable contrivances, as is shown in the homologous organs of the vertebrata; or they have been produced through the laws of evolution, in

* A belief in the doctrine of evolution does not necessitate acquiescence in any or all of the *causes* proposed, however probable natural selection or inherent principle of development, or any other or all combined, may be, and however much such provisional hypotheses may assist in understanding it.

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accordance with the principle of the retention of type, and it is believed have never had a use until accidentally called into action, as in the above-mentioned example. And, lastly, I would say that the conviction of their being ordinarily of no use, is only arrived at by a considerable acquaintance with them, and the causes which produce them.

One or two examples may assist in clearing away this difficulty from a sceptical mind. No one will deny the purpose of teeth; but what can be their "use" in the rudimentary form in which they appear in the young whale before it is supplied with "whalebone"? Again, the pappus or "down" of thistles and other genera of the Compositæ, &c., is justly regarded as a means for the dispersion of the seed; but why is it retained on those flowers which are neuter, and incapable of producing any? Of what use are the rudimentary pistils in bisexual plants appearing merely as minute papillæ in the centre of the staminate flowers? Might it not rather be assumed an evidence of a wise ordinance that organs no longer required should dwindle away in part or entirely, so that the energy or force demanded for their production is thus preserved and directed into other channels, while they appear capable, should nature require it, of a re-development with functional power?

Analogous arguments may be brought to bear upon this point, which will assist in limiting the ground of objection very considerably. Thus we might ask what is the use of plants producing myriads of seeds which can never possibly grow up to maturity? What is the use of parasites to man and animals, the frequent cause of suffering and even death? But it is not for us to call these facts to account. This is the issue of God's laws.

These brief allusions to the supposed imperfections of nature will be sufficient for my purpose, simply dismissing them with the cautionary remark that it is for want of a better expression that I use the word imperfection as implying relative perfection, without, however, attaching any meaning to the word, which may be thought derogatory to the Deity. But, on the other hand, it would be the height of absurdity not to admit most admirable contrivances and adaptations in nature. Are they evidences of what we call design, mental purpose, or intention? If any of these or kindred expressions can at all adequately represent the fact, I unhesitatingly say it is my firm belief such to be the case. Instead, however, of selecting some particular example, as the eye or hand, and saying such exquisite mechanism is a very witness in itself of being a direct emanation from the Creator, I would say it evidences at least

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what we call design; but as God's ways are not our ways, so believe it to have been evolved, and not created.

In the last paragraph a new difficulty will have been felt, viz., the inadequacy of language to express ideas of the Divine methods; so that in thus writing, the charge of misrepresentation, not to say anthropomorphism, can scarcely be avoided. I would therefore here state that in labouring to represent intelligibly notions as to God's methods of operation, I profess to be profoundly ignorant of them. All I would attempt is to show what appear to be analogous methods exhibited both in the works of nature and in revealed religion, although I cannot enter into the divine arcana, and unravel the mysteries of the processes of His acts. Rather than venture on any attempt to explain the divine methods by ordinary terms, I would prefer adopting some general expressions to convey an imagined idea of the causes of existing things, and as less liable to the charge of anthropomorphism.

I purpose, therefore, adopting the general word *force*, and recognizing all issues in nature as the effect produced upon matter by the resultant of component forces. These forces are separable into physical, chemical, biological, &c.; and, in addition to all those which the chemist and the physicist can eliminate and claim as the objects of their special studies, there still remains a residuum of forces in those organisms endowed with life, and which produce those results which we say are designed, and which it is customary to regard as witnessing to a divine intelligence.

In recognizing these latter forces, I would call them *evolutive*, but as being so far like others that their resultant with them produces relative effects only according as in their continual attempt at equilibration they are more or less counteracted or assisted by other natural forces.

As an illustration I would recognize every special issue of evolution, as, for example, some well-marked variety of animal (say pigeon) or plant (say rose) as the effect of the combination of the usually so-called natural forces in conjunction with the evolutive, as a temporary stable form, so long as environing conditions to which it was subjected remain the same. Hence appears the permanency of some species and races. Subject them, however, to altered conditions, and thus bring an unaccustomed set of forces to bear upon them, *e. g.*, by domestication or cultivation; the forms once so stable soon "break," the equilibrium is overthrown, and variations once more ensue.

It must be noticed that not merely the evolutive but all forces in nature are equally to be regarded as emanations from

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the Divine will; but just as matter, while undergoing integration, has become differentiated into existing organisms with their organs by evolution, so it would seem probable that force (or motion, as H. Spencer calls it) has become differentiated too. Hence the variety of forces which modern science recognizes as convertible or homologous, as well as the diversity of function obtaining among the varieties of form.

After all, therefore, what I have here called evolutive forces in the organic world may prove to be only particular phases of those which conspire to constitute animal and vegetable life. And just as in the vital force itself it is usual to recognize two such phases, viz., the vegetative and reproductive, so the power of development or continual advance or alteration from an assumed type may ultimately appear as particular forms of life-force issuing in those results which we are accustomed to look upon as designed.

Again, I would urge, how all this is carried out I do not pretend to say. We know that "God's ways are not our ways," and I would only paraphrase that remark by observing that as man is *external* to the works and forces of nature, upon which he operates and produces results which are simply the issue of combinations of nature's forces which are adjusted by his will, and rendered subservient to it; so God would seem to operate *through* His works. This particular aspect of His will, which is here represented by evolutive forces, appears to be *internal* to them, and may hereafter prove to be differentiations of perhaps one single force originally infused into matter, when "the Spirit of God 'brooded' upon the face of the waters."

In endeavouring to represent under the name of forces nature's execution of the will of God, I confess it must be very inadequate to silence the objection of those naturalists and philosophers who, judging from the apparent immutability of nature, not only deny the existence of design in the physical world, but also the efficacy of prayer in the moral.

With regard to the former difficulty, I think it is aggravated by the general idea of God being like man, an artificer; so that human relations have clothed the Deity in a somewhat false aspect. For an examination into nature seems to show that this is not the usual way in which God works. All is by "law"; the use of the imperative mood in the words "Let there be" of Genesis, would seem to be not so much the expression of one who creates, directly and with his own hand, as that which indicates agents external to the Creator, who has

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impressed upon nature forces whose province is to execute His will.

But the difficulty of understanding how design can co-operate with immutable laws will always exist. Yet why should that be any reason for denying it? We cannot fail to recognize it in a watch however imperfectly constructed, nor refuse to see it in a flint knife however rudely chipped; why deny it to the Creator, although we may discover in His works too innumerable imperfections, to be accounted for, however, on quite other grounds; and which are regarded (be it remembered) as a witness to evolution.

Is there no intention, then, in man's very existence, even if he had been developed from the quadrumana? Is there no intention in the adaptation of life to environing circumstances, though it may be brought about by law? Is there no design in the senses by which he can receive external impressions, though myriads of years may have elapsed in arriving at their present condition; and thousands of transitional forms experienced in their development? Is there no design in the mutual adaptations, correspondence, and connection between all his organs? If all these things and ten thousand others are due to *chance* combinations of laws, if the structure of the eye of a vertebrate has been developed from some barely sensitive spot of pigment by repeated chance improvements which have been beneficial to the creature, in conjunction with other changes, in accordance with the principle of the "correlation of growth"; which principle must be based upon chance as well, if not to be allowed as designed; then, it is clear, the chances would be infinity to one, that such variations would arise, and that, having arisen, the different organs would vary together; so that by some long series of chance variations the eye of a man should have been produced from something like the ocellus of an ophiura.

That the one has probably been developed from the other might be admitted, but I *must* recognize in the development—though subjected as it may be to interfering forces—the will and intention of the Deity.

As neither chance nor design admits of strict mathematical proof as to its being the cause of structure; the question seems to rest on the basis of probabilities. And if they appear to exclude the former, reason and faith alike combine to urge the latter.

But however convinced we may feel that design or mental purpose is evidenced by the works of nature, the most casual observer cannot fail to recognize *chance* as an element which enters largely into the condition of things.

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All living organisms are subjected to what may be called chance circumstances, or, as we might say, to accidental combinations of forces. These, it is thought, cause or induce variations by influencing the reproductive system;* nevertheless, Mr. Darwin is wise in saying that "our ignorance of the laws of variation is profound."† Yet the fact I wish to see recognized is *the power of the Deity to produce ultimate and designed results, not only by means of the recognized laws of nature, but through the so-called chance circumstances.*

It is when, as I believe, we find undoubted evidence of this being the case, that we are compelled to confess to the greatness of our ignorance, to feel that faith, or the evidence of things not seen, is as much required in the student of nature as it is in the pursuit of Christian duty, and that we can only then fully realize how all things are possible to God alone.

To illustrate this. Would any one, who at least believed in a Creator, deny that the physical constitution of this world was not destined to become relatively suitable for man? Yet it was brought about by a long succession of events, the issues of so-called accidental circumstances. Would any one deny that coal was not destined for man's use? Yet what is more accidental than that vegetable matter should accumulate in a peat bog or swamp; while the difficulties, dangers, and frequent loss of life and property in securing it testify to the relative perfection of God's purposes and works? Was it not designed that vegetable life should require water for growth and development, yet rain depends upon totally distinct causes, and quite irrespective of vegetation? Thus and in an infinity of other cases do we see evident purpose more or less over-ruling natural laws and chance circumstances.

I need hardly say it is quite unprofitable to attempt any explanation of the way by which the Deity can thus act. *But the recognition of the possibility is of the utmost consequence,* for it seems to strike at the root of all materialistic and atheistic views. It appears so utterly irreconcilable to us; although it is quite in accordance—as it is the object of this paper to show—with the Deity's methods in the moral and religious world, that, as is not unfrequently the case, a mind weak in faith gives way at the contemplation of this difficulty, denies design altogether, and reduces everything to blind chance.

* *Origin of Species*, p. 93, 4th edition. † *Ibid.*, p. 195.

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PART II.

In considering, next, the methods of Deity as revealed to us in the Bible, I wish to call attention to some striking analogies which will be found between them and those spoken of as existing in nature. Irrespective of the direct interferences which it is the province of revealed religion more especially to unfold, there is abundant evidence of the *indirect* manner in which God works, or of "Law" as it has been described when speaking of secondary agencies. And in addition, we have many cases recorded where intention or design is executed by means of *accidental circumstances*, often if not always involving the free agency of man, which, however, does not appear to afford any evidence of having been controlled. A few examples of the latter will illustrate this :—

God foretold to Rebekah that her elder son should serve the younger. He did not say how this should be effected, but she had not sufficient faith in God's promise, and so must needs bring it about herself. Hence, when Isaac said of Jacob, "Yea, and he shall be blessed," he was corroborating the will of Jehovah, though it was—we may safely presume to say—not brought about as God wished.

Again, the whole series of events, which issued in Joseph being the lord of Egypt, are such as might and did result from the free actions of his brethren and others; yet we cannot refuse to recognize design throughout, but must believe with Joseph, that such was the case when he said to his brethren,—"Now, therefore, be not grieved, nor angry with yourselves, that ye sold me hither, for God did send me before you to preserve life" (Gen. xlv. 5).

The Book of Judges supplies us with instances where God's judgments on the Israelites were executed by means of the incursions of neighbouring tribes; who, however, we have no reason for believing ever considered themselves as specially called upon by the God of the Hebrews to inflict punishment upon them.

Again, the account given in the 14th chapter of Judges, of Samson's going down to Timnath, is one of a natural sequence of events; but it is said of his father, who raised an objection to his son's taking a wife from among the Philistines, that he "knew not that it was of the Lord, that he sought an occasion against them."

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One illustration from the New Testament will suffice. It was Purpose that brought Jesus Christ into the world as a man, in order that He might die; but how was that purpose executed? It was no other than by a train of causes and effects which we cannot but recognize as "natural," yet they issued in a preordained result. The author of "Ecce Homo" has well explained this; that it was because the Jews could not forgive Him for calling Himself a king, and yet would not assume the attributes of their ideal monarch. Surprise merged into ridicule, ridicule into persecution, persecution into death.

We may here too notice how judgments or punishments were executed upon men and nations by means of natural occurrences. It is expressly stated that such was the case in olden times; but I need hardly add we have no actual warrant that God so acts now. In passing on, however, we may catch the lesson our Lord teaches us in the fall of the tower of Siloam, that though the destruction of life which it involved was—as we say—accidental, yet such are to be taken as warnings that, "unless we repent, we shall all likewise perish."

Lastly, the production of good out of evil, so generally recognized, surely bears witness to a Divine ordinance? Thus, for example, is that in the case of Joseph in Egypt; as also in the total abolishment of idolatry from the Jews by their captivity in Egypt; and, above all, that issuing from the sacrifice and death of our Lord.

It is in all such and other kindred operations of the Deity the difficulty which our finite minds feel so strongly really lies. That which has been so often expressed in the attempt to reconcile God's fore-knowledge with man's free-will becomes relatively far less in comparison with his power to overrule, as it were, but without limiting his free-agency.

This, of course, is no new difficulty, but as we find it represented alike in nature and revelation, they would at least seem to testify mutually to the truth in each.

Now an especial value of the discovery of this truth, which has long been recognized and testified to by such expressions as—"The lot is cast in the lap, but the disposing of it is of the Lord;" and "Man proposes, but God disposes," lies in the fact that it leads to important results, for it seems to throw great light upon the character of Providence.

The general idea of Providence appears to have arisen from the relationship which exists between a father and his family; and the fact that the whole Bible speaks of God under this aspect has of course tended to strengthen man's belief that

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such is universally the case. Hence the Deity is commonly said not only to be the great Creator, but also supporter of His works. Every creature is represented as the work of His hands. He is compared to the potter, who has power over the clay, and so forth. This, in the abstract sense, is quite true, and is a witness to God's designs; and no one would deny to him the power of assuming such character at will. But the human method of working, as a rule, does not seem to best illustrate the process of Divine action; though God, in Christ, perhaps testified to that possibility.

With all due reverence, with the cautionary remark that my words must be faulty and unable to convey a clear meaning of what cannot be described, and at the same time invoke no disparagement, I would say that the laws of Providence, like the laws of nature, usually produce but relatively perfect results.

The view of Providence as given by Christ may be assumed to be the best. He says—"Seek ye first the kingdom of God, and all other things shall be added unto you." Yet experience tells us that the temporal reward of obedience to that command is only true in a relative sense. The most godly life is no guarantee for a worldly fortune. Nevertheless, if we live "godly, righteously, and soberly," such is undoubtedly the very best means of ensuring general respect and temporal success; yet, on the other hand, it may fail, from a variety of uncontrollable contingencies, to prove successful after all.

So He also speaks of the sparrows; our Heavenly Father feedeth them, and not one falls to the ground without Him. Yet many a one of God's creatures perishes of cold and starvation in the winter, or from enemies at all times.

Now, in endeavouring to understand the nature of Providence both as regards ourselves and inferior animals, it appears to be much the same, or at least analogous. God has impressed powers upon animals by which they are enabled to procure themselves food,—though such powers, be it remembered, may have been all *evolved*,—yet not so absolutely but that opposing forces may overrule and destroy that providence, and which thus discover its relative character, as is, *e.g.*, manifestly seen between the relationship that obtains between beasts of prey and their victims. Now man has far higher powers; he can exercise his reason more fully, and his judgment so as to provide for contingencies, which they cannot do, except by the force of instinct, whatever that may ultimately prove to be. And unless he do use all his powers, he is not bringing such forces to bear against the overpowering ones of nature as he might, and he must accordingly succumb proportionately. This, of course, is

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nothing else than the law that he must get his bread by the sweat of his brow; but the point brought out prominently by these reflections is that the adjustment of forces producing success is not absolutely in man's power, so that he may be unsuccessful in the end. But then comes the thought that nature and revelation alike testify to the power of God to work out designs irrespective of the chance contingencies by which they are done. Faith comes in to supply the evidence where reason and intelligence fail; and the true Christian, while not slothful in business, patiently waits upon the Lord, and firmly believes, though he may fail to see it, "that all things work together for the good of those who love the Lord their God."

Instead, therefore, of weakening our belief in Providence and the efficacy of prayer, it appears to me only to call upon a further exercise of our faith, while we remember that "all things are possible with God." I believe, most assuredly, that prayer will be answered relatively, indirectly, and not absolutely, if the conditions furnished by ourselves be satisfactory, *i. e.*, if we perform as best we can our part of the duties involved in it,—that "if we draw nigh to God He will draw nigh to us;" and although we must not expect a miracle, nor even any immediate or direct answer, yet we may expect the reply to accrue through natural laws.

It is supposed by some that, as man adjusts nature's forces for special purposes, so God will combine and adjust His laws where we cannot, and bring about results, perhaps not as we should anticipate or even wish, but in accordance with perfect justice. But, without denying the possibility of the Deity acting thus or in any other way, I think it better not to attempt to explain how it is done, but believe He can and will do for us whatever He may see fit; and the illustrations I have drawn from nature and revelation would alike seem to warrant such faith.

Hence does it appear that there are no grounds for questioning the use of prayer, private or public or national, much less to exalt human contrivance as superior to and superseding it. But who can say that the very means adopted by man to exterminate an epidemic were not suggested by Providence through natural laws governing the human mind, or that its removal may not have been a designed issue evolved through a train of fortuitous circumstances? It is surely consonant with other facts of nature, and with revealed religion, to think so; and though here, as in accounting for the origin of specific organs, the results may have been acquired through natural laws, it does not at all impugn the statement that "every good gift cometh down from the Father of lights,"

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because that Father should see fit to grant such to us only through mediation of His own choosing.

The CHAIRMAN.—I need hardly call upon you to thank Mr. Henslow for this interesting paper, and I now invite discussion upon it.

Rev. C. A. ROW.—There are several things in Mr. Henslow's paper to which I should like to call attention for a moment, especially as one portion of the paper deals with a subject to which I have devoted an enormous amount of thought. But I want first to make an observation on the subject of this evolution theory generally. We are clearly not right in charging this theory with being atheistical, for it is conceivable that the Great Creator should have acted in the way which the supporters of the theory uphold. Still that is not my belief, though I admit that it is conceivably possible. We have the old illustration of Paley's about the watch. We all remember in the Natural Theology, where he points out that if the watchmaker, the artist who made the watch, could impart to that watch the power of generating another watch out of its own substance, that would not lessen the design involved in its production, and would not in the least degree show that the watchmaker was less of an artificer because he was able to produce a watch which should be able to generate another out of its own substance. So far, therefore, I do not think that any theory of evolution should be criticised as necessarily atheistical or even as denying the existence of design in creation. However, we have been promised a paper on this subject, and I hope we shall then have it thoroughly well discussed; for unquestionably it is one of the most important subjects of the present day. There is one difficulty for the ordinary mind in all theories of this kind,—they seem to banish the Creator to such an immense distance, that ordinary minds have a great difficulty in seeing God in a Person so far removed from them. These theories render it difficult to apprehend very distinctly the personality of the Creator, and I need hardly say that all previous systems of philosophy which had place anterior to Christianity, tended in the long run to get rid of the personality of God. The idea is the same: vital force in nature, an *anima mundi*, or something of that kind running through these hypotheses, making them pantheistic, but resolving nature into cause and effect. With such views it was difficult to arrive at a fair conception of the Divine Personality. There is one remark in Mr. Henslow's paper which is worthy of great attention. It is this:—

"In the first place, then, I would lay down this proposition, which I think will be found of universal application,—that there is, in all probability, no such thing in this world as absolute perfection."

Now, that is a proposition which we should have deeply impressed upon our minds in all our philosophizing. We cannot argue from any abstract principles that the Creator would have made the world in this or that degree of perfection —we can only take the facts of the creation as they stand; and

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all mere systems elaborated out of considerations from the Divine attributes, that because those attributes are perfect they must produce what we call perfect results, fall hopelessly to the ground. We have to deal with the great facts of nature, which is no doubt full of imperfections ; and I do not think that any of our ordinary attempts to explain away these facts will hold water. For example, it is a common thing to explain all the imperfections which we see in nature by the doctrine of the Fall. I will not say anything on that, except that it does not explain these things at all ; it only moves the matter a step further away ; and still the real difficulty arises,—why did the Creator so arrange things that man should be capable of falling ? That is one of the valuable things laid down in Butler's *Analogy*, and the more we study that book, the more we shall pay attention to this fact, that we must admit what Mr. Henslow has called imperfections in nature. I do not think "imperfection" is a good word to express this ; but, at the same time, I cannot tell what word we ought to use to fill its place. There are, no doubt, certain imperfections in nature. In my finger, for instance. Did not God make it ? Yes ; and so I might run through creation. Wherever I see signs of physical evil, whatever they may be, I am obliged to think them to be in conformity with the supreme will of the Creator, and any reference to a subordinate cause is out of the question. One expression has been used in this paper which I do not agree with. Mr. Henslow speaks of the passage "God's ways are not our ways." Now, that is true in the sense in which it is used in the Scriptures, but it is not true in the sense in which it is used here. Mr. Henslow seems to suppose that we can measure the Divine ways by something else than our ways. But this is not true ; God's ways are not our ways, and we know nothing of them, because no conception of them can be formed by the human mind. This leads me to refer to another passage, where Mr. Henslow speaks of trying to get rid, more or less, of the language of anthropomorphism. I believe that that is simply impossible, as is shown in Mansel's *Bampton Lectures*. We may abstract, from our conception of the Deity, the more strong anthropomorphic forms, but abstract them as we will, what do we leave behind ? A remnant which is anthropomorphic after all ; or—to use Mansel's words—after we get rid of human feeling, human love, human affection, and so on, we really leave human coldness behind. There are many other points in Mr. Henslow's paper which I should prefer to leave other hands to deal with, and therefore I will pass over them, and turn to the second part of the paper, which I wish the author had elaborated to a much greater degree, because he has touched upon many important points, and I am not prepared to say what are his views upon many of them. At the beginning of the second part Mr. Henslow says :—

"In considering, next, the methods of Deity as revealed to us in the Bible, I wish to call attention to some striking analogies which will be found between them and those spoken of as existing in nature."

Now, this is most important, and would bear to be treated of in a separate paper. I believe myself that God exhibits Himself in nature, in history, and

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in revelation ; and now I will just test the theory of development a little by the mode of God's action as manifested in history. I suppose all God's modes of action to be analogous, and therefore He works after a similar manner in creation, in the development of history, and in connection with revelation. That is the view of Butler in his *Analogy ;* and, that being so, we expect to find Almighty God working alike, or, at any rate, with a considerable degree of analogy, in all these instances. I think, therefore, that we may arrive at some conclusion—not demonstrative, not certain, but in some degree probable —as to the mode He would be likely to adopt in working in creation by observing the mode in which He has acted in history. Take the evolutions of man in history ; and there is no doubt that the theory of gradual development is true to a considerable extent. There are no great leaps. One state of civilization slowly evolves itself, stage after stage, out of another ; one system of thought slowly evolves itself out of another ; one system of philosophy arises from another in the same way ; and the more we notice this the more we see that all systems of philosophy are closely related to each other. This is very remarkable ; and I think it can be abundantly proved that there is, at least in the developments of God in history, a considerable amount of what we call development by gradual progression. Having stated that generally, I want now to draw your attention to one place where this result utterly and entirely fails. We may undoubtedly trace, in the course of history, the long, slow, gradual processes by which Almighty God prepared the way for Christianity. It is one of the most remarkable things we can arrive at by the study of history, to see that great set of causes, operating by result after result, by which the human mind was prepared for Christianity, or, to use St. Paul's language, "when the fulness of time was come." I will not go to Eastern nations, but we can easily see the gradual state of preparation for the development of Christianity, and it is marvellous to consider what might have been the result had one single link in the chain of succession been wanting. Here comes in Mr. Henslow's view of accident. I do not think there is such a thing as accident : I think we have a proof of care and intention in the means whereby the world was gradually prepared by an immense succession of causes, for the advent of Christianity. Let us take an example. Every one must know that one of the greatest events in history, in preparing the way for Christianity, was the conquest of Alexander the Great. Now, the whole set of events leading to his expedition into Asia was brought about by an infinite amount of preceding events, and if any one of them had failed, the expedition would not have taken place. What was the result ? The adoption of Christianity throughout the heathen world. Here was one of the greatest instances of moral and religious development in the ancient world entirely in the hands of Providence, and gradually evolved to prepare the way for Christianity in its intellectual and moral developments. Let us take the Roman empire—what took place there ? There were an immense number of preceding causes all culminating in one result, and beneficially preparing the way for Christianity. Having pointed out this much, now let me state that the chain breaks in one point. I have

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most carefully examined this point, and half of my life has been occupied in endeavouring to fathom the immense gulf that separates the four Gospels from the whole of the previous thought of the ancient world. Every one must concede to me, that there is an enormous interval separating the four Evangelists from the whole thought of the ancient world. I therefore draw attention to the fact, that although evolution does prevail in human history, yet in revelation it breaks, and, I may say, a new creation takes place.

Mr. REDDIE.—I do not know how Mr. Row reconciles the latter part of his views with what he said at first. He has failed to show that what is called the revelation of God in history is analogous to evolution in creation——

Mr. ROW.—I assume it.

Mr. REDDIE.—To assume this is one thing; to prove it is another. And I am surprised to find that Mr. Row appears almost on the other side to that he has previously occupied, and now as not advocating free agency. But I deny that we can properly attribute to God what is produced by human agents, and I hold that what constitutes the history of the world has been worked out by the moral agency of free agents——

Mr. ROW.—I hold that God does overrule and does hold in His hands the free agency of man. I hold the doctrine of free agency, but I believe that God holds it in His hands in a way I do not comprehend. (Hear, hear.) No one believes more in human free agency than I do; but yet there is some mode or other, beyond the reach of mankind to fathom, in which the Great Creator holds it and shapes it for the success of His own purposes.

Mr. REDDIE.—No doubt Mr. Row is in a difficulty, and I will try and help him out of it. He talked of the theories of evolution pushing the Deity to a great distance away from the minds of ordinary men; and I must say, that he seemed to me, notwithstanding these qualifications of his theory of man's history, to do very much the same thing. Now, I consider that man is a free agent, and that he does a thing because God has given him the liberty and power to do it. A man cannot fly, but he can walk and move within certain limits. He can knock another man down, or leave him alone, there is no doubt about that at all. But, then, God brings good out of evil. For instance, he may cut off one evil doer by death, and allow others to lead long lives, doing works which are most pernicious to their fellow-men; but all this is overruled for the best, without interfering with individual free agency. At our last meeting we discussed God's absolute determination to sweep away a whole evil race of men by a flood; and it is in this way that God, Who is not a God afar off, but Who is constantly present among us, overrules the evils of free agency. I do not believe at all in the views of the author of this paper. The tone of the paper I quite agree with; but I think it a compromise, and a compromise —I do not say it discourteously—unworthy of those who take that view. We must learn to speak of evolution, which really means Darwinism and Pantheism in a straightforward way. There is one passsage in this paper

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which precisely corresponds with the very worst passage in Darwin's book, where Mr. Henslow speaks of its assumptions perhaps being hereafter proved. The paper is full of hypothetical "ifs"; "if" this and "if" the other, and so on. But this is the passage to which I refer :—

"This particular aspect of His will which is here represented by evolutive forces, appears to be internal to them, and may hereafter prove to be differentiations of perhaps one single force originally infused into matter, when 'the Spirit of God "brooded" upon the face of the waters.'"

Now I do not believe that there is anything consistent with our knowledge of physics or of natural laws, and still less is there anything consistent with our knowledge even of history, which will warrant such a conclusion as that. Thinking as I do, it is only honest for me to say that. The sooner we meet such views as these straightforwardly the better. We should see what they plainly mean, and refute them if we can, and if not, admit that we cannot. In the same paragraph we have the words which Mr. Row has already commented on—that "God's ways are not our ways," and I agree with what Mr. Row has said upon that point. In the first place, the phrase which occurs in one of the prophets—Isaiah, I think—has nothing to do with physics. We have no ways in physics : we cannot create anything. We have nothing to do with the air we breathe, or with the food that feeds us. We can cook and manipulate food, but as to its creation or its mode of existence we have nothing to do with that. I entirely object to texts of Scripture which have nothing to do with physics or science being brought forward and used in this way. I am sure Mr. Henslow will let me say this without feeling any offence, because this is an important matter, and in this Society especially there is some difficulty in knowing well how to draw a safe line. We are most anxious not to go unnecessarily into the exegesis of Scripture, and most anxious to test scientific truths scientifically, as in any other scientific or philosophical society that studies physical science ; and I object to having the Scriptures brought forward in this way. Every logician or man of common sense knows that a text applying to one particular class of things should not be drawn in, as it were by a side wind, and made to apply to totally different things. This, however, occurs more than once in the paper. In one part there is this most extraordinarily illogical sentence :—

"Instead, however, of selecting some particular example, as the eye or hand, and saying such exquisite mechanism is a very witness in itself of being a direct emanation from the Creator, I would say it evidences at least what we call design ; but as God's ways are not our ways, so I believe it to have been evolved, and not created."

An eye evolved and not created ! That is simply Darwinism, and the reverse of design. Our Chairman has already refuted, in this very Society, the irrational notion that an eye could be evolved in the way Darwin puts forward ; and, I regret to add, in the way tacitly put forward in this paper——

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Mr. Henslow.—I do not believe in Darwin's theory; and I have endeavoured to refute t by showing its utter impossibility.

Mr. Reddie.—I cannot help there being inconsistencies in the paper. I can but take the sentence as it is, and there can be no doubt about it at all, if the "it" applies to the eye or the hand——

Mr. Henslow.—In another place I have especially guarded myself against that.

Mr. Reddie.—Still I have nothing to do with the paper being inconsistent with itself——

Mr. Henslow.—But that is not inconsistent.

Mr. Reddie.—Excuse me, but does the "it" refer to the eye or the hand?——

Mr. Henslow.—Yes.

Mr. Reddie.—Then we are just where we were before. I say our Chairman has refuted the evolution theory according to Mr. Darwin's idea. If Mr. Henslow has a new way of evolving an eye by accident, it would be interesting to know what it is——

Mr. Henslow.—Look at the end. It does not imply that.

Mr. Reddie.—Does it not imply "evolved"?

Mr. Henslow.—"Evolved" does not necessarily imply by accident.

Mr. Reddie.—Well, if this is a new Darwinian theory, still the logic is peculiar. The author says, "But as God's ways are not our ways, *so* I believe it to have been evolved, and not created." That is a form of logic which surprises me. Man cannot create anything. And if we say God does not create, that is making His ways like our ways! I do not know whether Mr. Henslow is an Oxford or a Cambridge man; but Dr. Thornton told us some time ago that there is no such thing as logic at Oxford, and certainly this is most extraordinary logic. Then there is one passage which Mr. Row commented on, and agreed with, but which I cannot agree with,—namely, that there is no such thing in this world as absolute perfection. Not that I deny that there are many things which are imperfect; yet Mr. Row did not give us any instances. He spoke about his finger——

Mr. Row.—I could give you hundreds in a moment if you liked.

Mr. Reddie.—We may cut our fingers, or a man may have a bad constitution and his fingers may be imperfect, but that is merely exceptional, and there are certainly many things which do not come into the category of imperfect. I do not know whether Mr. Henslow is prepared to admit that crystals are perfect, yet he tells us that we have no perfection in nature. I do not know whether he thinks pure water and air are perfect or imperfect; or whether he can say why, if he thinks them not perfect. I must confess that the more I look at nature the more perfect I find it. We are very ignorant, and on that account we might well say that "God's ways are not our ways," though we are not so ignorant as to be justified in quoting such texts *mal à propos*. Then with reference to anthropomorphism,—I shall speak with some hesitation about that, as I think it should be brought forward in a distinct paper, and treated in a careful manner. We had this

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subject before us at one of our meetings, when Mr. Warington, in a paper which he read to us, spoke about "God's eyes" and "God's ears" and so forth, pointing out that what was said about God's seeing and hearing was not strictly applicable to God, but was an anthropomorphic way of speaking in accommodation to our understanding. But I beg to observe that it is not the eye or the reflection of the image on the retina which sees—you may have that in a dead eye—it is the spirit of the living man which sees through this means. He sees *through* his eyes and hears *through* his ears; and so, what hears and what sees are truly analogous to God's hearing and seeing, only man sees with certain visible instruments, and God can see without them. To confound the sense of seeing with the mere mode or form is a very shallow philosophy; and I think Mr. Row would be one of the first men, when he reconsiders these things, to stand up and refute his own notions——

Mr. Row.—I think you have misunderstood me.

Mr. Reddie.—He would be one of the first to admit that it is not the eye that sees, but something beyond the eye; and not the ear that hears, but something beyond the ear——

The Chairman.—And "He that made the eye, shall He not see?"

Mr. Reddie.—Quite so; but what I want to point out is, that there is a much greater resemblance between man and God than we conceive when we speak in this way; and that it is much more accurate than some think, to speak of God as seeing and hearing, and as exercising those other attributes which we have in a certain sense also in ourselves, but which He has in perfection. There are two or three minor points in the paper which I intended to speak of; but I do not much like going into minute criticism, especially considering the extraordinary amount of assumption that runs through the whole paper, and the peculiar way in which the author has put everything forward,—as, "I believe so-and-so to be the indirect result of God's will," and "it may be that so-and-so never had a use until accidentally called into action," as in the case of the mammæ of the male sex, which Mr. Henslow says he believes to be "capable of rendering active service." I understand from the Chairman that it is recorded that in one case a man was known to give suck, but I must say I do not believe it——

Mr. Henslow.—It is a well-authenticated case.

Mr. Reddie.—Well, I do not believe it, and even if it be the case in one instance, remember *exceptio probat regulam*. But I will give you one or two other instances of these assumptions, which I am sorry to see contained in the paper. The author asks this strange question approvingly:—"Is there no intention in man's very existence, even if he had been developed from the quadrumana?" Well, if we are to believe that man was created in this low and degraded state, it would alter the whole of our conceptions of God's works. If we believe that man has been developed from one of the quadrumana, we shall have to look upon him in a very different light than heretofore. But it has been refuted over and over again that man could ever have emerged from a savage state, if he had been created only so imperfect as that. Further on the author says:—

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"Is there no design in the senses by which man can receive external impressions? Is there no design in the mutual adaptations, correspondence, and connection between all his organs? If all these things, and ten thousand others, are due to chance; if the structure of the eye of a vertebrate has been developed from that of a radiate by repeated chance improvements which have been beneficial to the creature, in conjunction with other changes, in accordance with the principle of the 'correlation of growth,' which principle must be based upon chance as well, if not to be allowed as designed; then, as every mathematician knows, the chances would be infinity to one that such variations would arise, and that, having arisen, the different organs would vary together; so that by one long series of chance variations the eye of a man should have been produced from the ocellus of an ophiura."

That is, in my opinion, downright nonsense, utterly unproved and contrary to all we know, and I cannot admit any such arguments based on a mere series of "ifs"——

Mr. Henslow.—You misunderstand me. I am simply showing that even if we concede to the extreme supporters of Darwin's theory everything they ask for, my view is still right.

Mr. Reddie.—But I object to conceding such points, and assuming the possibility of these things, when there is not a shadow of proof in their favour——

The Chairman.—It is rather an obscure passage, but I do not take Mr. Henslow to mean what you do, but the very contrary, that there is ample proof that such an argument could not have been mathematically sustained even by any of these "ifs."

Mr. Reddie.—I do not ask for mathematical proofs, but I do say that this is an unfair and unsafe mode of bringing these things forward, especially when Mr. Henslow ends the passage by saying "That the one has probably been developed from the other might be readily admitted." I say that in this Society, until there is some reason for such admissions, these things should not be brought forward in this way. If there is any proof in their favour, let them be received by all means, but if not, let there be no such concessions made. With regard to variations, I can only say that that part of the theory which is true is not new, and it is only when it goes beyond the bounds of science that the theory has been controverted and shown to be false. As to a development from monkeys into men, there is not a shadow of proof for believing either in its probability or possibility. It is the most absurd thing that was ever put forward in the name of science, and matches the most foolish notions of the darkest ages or the least enlightened of mankind.

Rev. J. H. Titcomb.—After the somewhat severe manner in which Mr. Reddie has dealt with this paper, and expressed his opinions on points with regard to which he differs from the author, it may be interesting to turn to parts of the paper where we have a greater agreement with Mr. Henslow. Whatever our views of evolution and creation may be, I think we shall have but one opinion as to the great value which this paper possesses in the vindication of the possibility of design on the part of God running parallel with

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immutable laws. Now that seems to me to be the very gist of the whole paper. I do not go into the question of the evidence or the proof of the thing; but the object of the paper is of that healthy character to show in its moral bearings a rational and logical basis for believing that it is possible for immutable laws to exist, and yet for God to have a mental purpose subserving them and at the same time governing them to carry out limited designs in full concurrence with those immutable laws. I think the paper states this well, where Mr. Henslow says it is unprofitable to explain the way in which the Deity has brought about the modes in question, but that the recognition of their possibility is very important, and that though it may appear impossible to materialists and atheists, the fact itself may be a logical necessity. Now I fully concur in that, and as philosophers we should strive to show that it is possible to believe in the concurrence of those two things. May I be allowed by way of supplement to this paper, or as an illustration, to give you from mathematics, what has struck me as an interesting piece of evidence on this subject. There is a certain curve called the hyperbola, and a line drawn in a certain direction approaching it is called the asymptote, and the property of that curve is that, when continued indefinitely, it shall always be drawing nearer to the line but yet it shall never touch it. You may say it is impossible, and that the two lines must meet if they are carried far enough, and must intersect each other. Yet the two lines will go on for ever, always approaching each other, but never coming in contact. Now it strikes me that that is an illustration which is exactly to the point. It is conceivable to my mind that there may be an immutable law expressed by the curve, and God's designs expressed by the line, and that they may be going on together almost parallel; and though you would say "they must intersect each other somewhere," yet each may remain intact. I put this forward merely as an illustration of an interesting point brought out by the paper. In the second part of the paper, Mr. Henslow speaks of accidental or chance circumstances in reference to God's government of the world under physical laws, or where those laws pass into God's moral government of the world. I am willing to allow, and indeed we must all allow, that there may be such things as chance circumstances. If by any chance this tumbler were too near my hand, and fell down and was broken, we should say that that was chance. It would be pushing the doctrine of Providence to an absurdity to say that God ordained everything, down to the smallest and most trivial of occurrences. (Hear, hear.) But while I admit that, I do think that we ought to distinguish between the possibility of it and the universality of it; there are many things in the history of the world which I believe are not the result of chance or accident, and we must look this fairly in the face in relation to the question of prayer, which forms the subject of the last portion of the paper. As I understand it, the full discovery of the working of God's moral government belongs to a higher sphere of thought—of more recondite and subtle thought—than the working of His physical laws, and it is utterly impossible for the mind of man thoroughly to penetrate it. In his best state, and when he is in possession of the profoundest genius, he must acknowledge that he is but an ignorant

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child in these matters. At the same time we may get certain glimpses of the way in which it is possible for the Deity to act without any interference with the free agency of man, and men may operate in accomplishing the works of God without their being treated as if they were mere machines. I have no doubt we have all found ourselves acting on a certain impulse. We know not why, but some particular impulse, or some desire to do something, leads us to perform an action which we have no rational motive for entering into. Then comes the question whether it is conceivable that God, acting upon man, may possibly produce that result without any interference with or limit of his free agency. You must allow this, that it is possible for the Deity to suggest thought to man. I cannot conceive anything unphilosophical or illogical in that idea; and if so, it would certainly not necessarily interfere with free agency, but it would take exactly the same position with regard to our responsibility as the suggestion of an ordinary friend, who says, "Will you not do this or that?" In that there is no getting rid of free agency, or any interference with our moral responsibility. Apply it, for instance, to the case of Joseph. Joseph was sent by his father to look after his brethren, who put him in the pit, and had not the merchants come up at that juncture he would infallibly have been left to die. The whole of the events with which he was afterwards connected in Egypt turned on that fact, that the coming up of the merchants and the visit of Joseph and his brethren to the pit concurred together chronologically. The question is whether it is conceivable or whether it is possible that that should be viewed as an indistinct overruling of an accidental circumstance, or whether, by a more direct agency, God so acted by a species of impulse on Jacob's mind, that at the right moment he said to his son, "Go and look after your brothers." Had it been a few hours earlier or later, Joseph might have died in the pit, but that precise moment having been chosen, all happened rightly, and everything turned out according to the will and promise of God. I conceive that that is the foundation of one view in which God, as the Hearer and Answerer of prayer, may be contemplated as not interfering with the immutable laws of nature or with the free agency of man, while yet He brings about hidden and designed purposes of His own consistently with philosophy, reason, and religion. These remarks vindicate the paper, I think, in some respects; and, though I agree with Mr. Reddie in relation to other parts of the paper, still I think its moral bearings are most important.

The CHAIRMAN.—In speaking of this paper I must commend the exceedingly reverent tone in which the author has discussed the subject, and I should only like to see all such subjects discussed in a similar tone. The view which Mr. Henslow brings forward, however, does not appear to me to be a very original one. It was the first view which was ever brought forward on the subject of the doctrine of evolution; and I was one of the first to point out that the whole doctrine of Darwin was one of a retrograde character. The whole tone and argument of this paper, except that which relates to the attributes and moral government of God, is nothing more or less than

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the same view of the doctrine of evolution which created such a sensation in this country when that famous book came out, *The Vestiges of Creation*. So far as I can understand all the arguments of Mr. Darwin, they have been simply an endeavour to eject out of the idea of evolution the personal work of the Deity. His whole endeavour has been to push the Creator farther and farther back out of view. The most laborious part of Darwin's attempt at reasoning—for it is not true reasoning—the most laborious part of his logic and reasoning, is intended to eliminate, as perfectly as any of the atheistical authors have endeavoured to do it, the idea of design. Now, setting revelation aside, the manner in which the unknown author of *The Vestiges of Creation* treated this subject, satisfactorily showed that the doctrine of evolution was not in itself an atheistical doctrine, nor did it deny the existence of design. So far as I could understand and make out, having carefully read the book at the time it came out and afterwards, and having carefully analyzed and compared it and Mr. Darwin's book with each other, so far as I could understand it, the doctrine of the author of *The Vestiges of Creation* was simply, that God created all things, and that when He created matter he impressed on it certain laws ; that matter, being evolved according to those laws, should produce beings and organs mutually adapted to one another and to the world ; and that every successive development which should be produced was essentially foreseen, foreknown, and predetermined by the Deity. His idea, for instance, of the evolution of an eye from a more simple organ, was that the ultimate eye—man's eye, for instance—was to be a perfect optical instrument, and that its perfection depended on the previous design by the Creator, that at a certain period it should appear in a body quite adapted for its purposes. There is one question—and not the only one, but we must consider it as an important question—whether you can maintain a doctrine of evolution which shall not be atheistical, and which shall admit the great argument of design. That is one thing ; but the next thing is, does such a doctrine as that accord either with revelation or with the facts of science ? I do not believe that it can be made to agree with what we believe to be the revealed word of God, and I do not believe that it has in the least degree been proved that the doctrine is consistent with sound science ; and by that I mean those proved facts, which we can believe in, and have believed in. In fact, I do not believe that it has passed through those three stages which Mr. Henslow mentions when he says :—

"That the doctrine has been suspected and ridiculed is no more than might be anticipated, for all startling and new theories pass through the three stages of ridicule, examination, and acceptance, if found reconcileable with truth ; and evolution is now being rapidly transferred from the second to the third stage."

There I join issue with Mr. Henslow, and say, that from a scientific point of view, I do not think the doctrine of evolution has gained anything like universal acceptance. I think that when you have read *The Vestiges of Creation* and Mr. Darwin's books, and after you have examined the facts

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which Mr. Darwin brings forward in aid of his theory, you will come to this conclusion, that the more these facts are analyzed and sifted, the more they are found not to accord with what we know of the whole facts of nature, but the very reverse. And I would adduce as a proof of this, that Mr. Darwin, after all his efforts, finds that his doctrine of evolution will not accord with the facts of nature ; and he has therefore introduced a new hypothesis, which most essentially denies his previous doctrine of evolution altogether. One of the most difficult facts which he had to account for by his system, was the constant tendency, however much man might endeavour to check it by cultivation or by any other means, the constant tendency, on the part of the living being experimented upon, to recur to some peculiarities of its ancestors. He has endeavoured to get over that difficulty, by saying that no new organ whatever can make its appearance, unless it arises from a gemmule which was already in existence in the first progenitor of all those forms. Take the eye, with all its marvellous adaptation. How is that reproduced and transmitted from one individual to another ? Why, according to the new theory of pangenesis, for every portion of that eye, whether we take the vitreous humour, the crystalline lens, or the aqueous humour, or indeed any other part of it, there must have been some hypothetical minute gemmules or particles in the immediate predecessor of the being which possessed that eye ; and none of those parts or organs could be produced of themselves by any means, unless there had been antecedent gemmules having the power to produce them. But carry that back, and take your doctrine of evolution straight from your original monad—that original extraordinary thing in which Mr. Darwin would say life was first apparent—take it in its most simple form ; and according to Darwin's own theory that original monad must have contained in itself all the gemmules of all the creatures that have ever been produced from it. You do not, therefore, go back to a system of evolution, but to the creation, in which that monad was a cosmos in itself, with all the germs of all its successors contained in it ! And that is Darwin's own idea ; because he tells you that the reproducing of an organ, or of some appearance in an organ, which can be traced to an ancestor 50, 100, or 1,000 times removed, is a proof that it comes from gemmules previously existing. He has then to account for undeveloped gemmules passing through successive generations ; but he proves nothing, and he is obliged to supplement his first doctrine by what practically denies the whole doctrine of evolution. Now I do not find that Mr. Henslow has really adduced any facts whatever in support of the theory of evolution, except the appearance of certain rudimentary organs, with the assumption that these rudimentary organs can only be accounted for on the principle of evolution. I take it for granted that,—with the exception of that amount of evolution spoken of by Mr. Reddie,—the whole of this doctrine of evolution is contrary to the plain statement of Scripture. I do not see how you are to take the plain statement of man's creation, and then to go to a theory of evolution which would make man only an improved ape. I do not see how these two doctrines can be at all reconciled. But now we come to another point, and that is, whether this theory of evolution really

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accounts for the facts of nature which are brought before us. The great reason on which it seems to rest is, that if you take all the various forms of animal life, whether vegetable or animal, they seem to progress upwards from forms of extreme simplicity, gradually increasing in complexity until they come to the highest forms in the vegetable or in the animal world. When the science of classification was in its infancy, it seemed to be clear to men that they could make such a system as would give them a very philosophical mode of tabulating or classifying or arranging all the forms in nature; but I believe that when that is examined with some degree of accuracy it is not found to fit nature at all. We have not yet arrived at, and I think we are at a great distance from, any really good natural non-artificial system of classifying either plants or animals. On the contrary, we find that, instead of their being capable, as we supposed, of arrangement in one progressive line, ranging up from the simplest to the most complicated, they rather seem to be formed in circles, and not in lines; and some have proposed a circular arrangement into groups; but they have found the greatest difficulty when they have attempted to arrange them according to any law of progression whatever. But suppose you could so arrange them; it is supposed, according to this law of development, that all the more complicated forms have arisen by successive variations from simpler and less complicated forms. But those who maintain this theory have been unable to give us any proof whatever from the history of the beings of this world, or from the conditions under which they are placed, in support of such a theory. We find that all the most ardent supporters of this theory are unable to do so. When Darwin is asked to produce all those variations and changes, and to show when they took place, he confesses that they are not yet found. Even with his geological theories of extensive past ages, he cannot, in any stratum of rocks, find evidence in support of his theory, and therefore he tells us that they must yet be found in unknown and undiscovered strata of the earth! He says the proof will come hereafter, but for the present he does not bring a single atom of proof to show that his theory has been at work. If his theory were a true one, there would be evidence of this progression going on now, and it would have to be shown when, in history or in man's knowledge, the first steps really took place, and the inspiration of life went into inorganic elements. That difficulty was felt, and is still felt, by all the Continental advocates of the theory of evolution. It was felt by the author of *The Vestiges of Creation*, and he endeavoured as well as he could to establish the theory of spontaneous generation. We find that all the men on the Continent who want to set forth this theory are striving as much as they can to produce something like a proof of the possibility of spontaneous generation. But has that theory been proved? The facts on which the author of *The Vestiges of Creation* triumphantly relied have been found to be no facts at all, and have been entirely refuted. We sometimes hear that some one in Germany has discovered this or that, but we never have these animated molecules brought before us; and the more we go into the matter, the more a close investigation puts the theory of spontaneous generation further and further out of the

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domain of science. There is no natural progression to be shown from the inorganic to the organic world. Take the lowest form of organization you can find that is capable of producing organic substance and of reproducing its own kind; you have not the most remote analogy to that, in the most highly-developed forms of the crystal, or in anything else which belongs to the inorganic world. You have nothing in the formation of crystals which is at all analogous or approaching to the power of the living organism which is capable of producing other beings like itself. But if the doctrine of evolution be true, how is it, unless you add to that doctrine a continued series of successive creations, that inferior beings are now existing along with higher ones? How is it that the lowest and the highest forms exist at the same time with one another. That is a great difficulty which all those who maintain the theory of evolution have to get over. It is not enough to say hypothetically that one creature has been stopped in its development at one stage, another stopped at a more advanced stage, another at a still more advanced stage, and so on; you must show the probability of that. Then comes the question of rudimentary organs; but before I go to that, there is one thing with regard to which I wish to state that I entirely differ from the author of this paper. Mr. Henslow says:—

> "Our ideas of perfection can only be relative. As we say, in speaking of intellectual and moral attributes, that perfection resides in the Deity alone, which may therefore represent the limit to which we are continually endeavouring to approach, but can never reach; so in the works of nature our conception of the perfect is never realized."

Now, the defect of that passage arises in this way:—Mr. Henslow was confining his attention simply to the organic world, and not considering the inorganic. Now, I have not yet understood or seen anything like imperfection in the inorganic world, or in the laws which regulate it. Speaking of these laws and of their results, there is nothing abnormal to be found in the inorganic world. It was fully brought out by Professor Whewell, in his works, that you find nothing of an abnormal nature there. You have nothing like disease in the laws of chemistry, in the laws of crystallization, in the laws of light, or in the laws of gravitation. Dr. Whewell says, you cannot conceive disease in gravitation, or imperfection in the movements of the solar system. At first sight, and on a superficial view, men may suppose that they have found imperfection, as when it was thought that there was something in the laws of gravitation which would lead to the destruction of the solar system in a certain period, but that was found to have depended on a mistake in the integration of an equation, and that the seeming irregularity was in reality a most marvellous and beautiful adaptation of laws, giving us a most wonderful argument for design. I cannot conceive anything like disease or irregularity in the laws of the circulation of the wind or water. All these things have apparent irregularities; but the more we examine and analyze them the more we find that these apparent irregularities are really the objects of design, intended to operate for the benefit of God's creatures on earth. But then

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comes this very remarkable thing, that we do get abnormal laws and disease in the animate world, and especially in contact with just that part of creation which we have set before us as containing the most marvellous instances of God's design. Of course, when I say "most marvellous," I mean that which comes home as such most strongly to our minds :—I do not mean that the instances we get in one direction are really more marvellous than those which we get elsewhere. I quite agree with Mr. Henslow and with Mr. Row that every part of animated nature somehow or other sets before you an ideal of perfection ; but that when you attempt to find that ideal, by comparing one creature with another, it is lost. How must we account for this seeming imperfection when we have such great perfection shown everywhere else ? I say emphatically, as a believer in the Bible, that the Bible is the only book that throws light upon that. We have been asked to-night what the Fall has to do with it——

Mr. Row.—I said that that gave no adequate account of it.

The Chairman.—Now, the Bible to my mind does give a very adequate account of it. When God made all His works, He pronounced them to be "very good" ; and the Bible tells me that man, the chief of His works, fell from the perfection in which he was created ; and that when he fell from that state, and a curse fell upon him, that curse not only fell upon man, but the earth was cursed for his sake. That curse not only fell upon man, but upon the whole of the living creation, whether vegetable or animal——

Mr. Reddie.—I hope you do not mean to say that man was cursed, because it is really not the fact ?

The Chairman.—I say that man fell under the curse of God on account of his disobedience——

Mr. Reddie.—The Bible does not say that man was cursed. Even after the world was destroyed by the Flood, it is written, "And God blessed Noah and his sons" ; but there is no cursing of man in Scripture.

The Chairman.—But the Bible does set forth that the curse on creation was on account of man's fall,—that was its effect ; and revelation is the only thing that gives us an explanation of the matter. To my mind it is a most adequate explanation ; and it seems to throw a flood of light on the apparent nature of disease and abnormal forms, and the introduction of imperfection into that which God had pronounced to be very good. With regard to the rudimentary organs, they have been accounted for, by those who maintain what I believe to be the Biblical account, not by the law of evolution, but by the fiat of His will. We have no right to limit God's action, or to say that He must work according to the theory of evolution ; and if the Bible is only opposed by theories of science, we should hold by the Biblical account until science gives us something like an authoritative proof in contradiction. It will be time enough to attempt to make the Bible square with it then, and I certainly doubt the policy of attempting it beforehand. But how may the rudimentary organs be accounted for ? That which men, with imperfect knowledge, have considered to be superfluous and unnecessary, a more advanced knowledge has shown to be essentially necessary to the well-being of the creature.

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In a mixed assemblage I cannot go into many instances, to show the great and important effect upon the constitution of men and women of certain organs or parts of their bodies, which might be considered unnecessary at first sight. But, then, there is another reason. Suppose these organs are not highly developed; it does not therefore follow that they are not necessary. It was Hunter, I think, who said that a duck had a foot adapted for swimming or for walking, but that it was not a good instrument for either purpose. But I think it is. It is unquestionably a good paddle; and I only wonder that it has never yet been adopted among our means of naval propulsion——

Mr. Reddie.—It has often been tried and patented.

The Chairman.—Yes; but we have never yet succeeded with it satisfactorily. Notice the style of architecture in a foreign country or age, or the style of painting of particular artists. A connoisseur is enabled to determine that a particular picture is the work of Michael Angelo, of Raphael, or of Correggio from certain peculiarities which run through the works of each artist. It may not be irreverent for us to suppose that God has so created all things, and so impressed upon them certain characters, which may appear to us to be wholly useless and unnecessary, in order that His creatures should know that they are the works of one architect, of one designer; and surely, if they serve no other purpose, they accomplish a highly important work in connection with the history of man's knowledge of his Creator. But for these things we might suppose different architects having the power of creating; but for these things we should not have our greatest and strongest argument in favour of all these being the creatures of one author. But that is not the only point which we have to consider: we are gauging these things by our own views of utility. But why was it necessary that man's mind should be able to distinguish all the beautiful and gorgeous colours of nature,—that which adds so much to man's enjoyment, and is the great charm of our paintings? Why was man possessed of that power to perceive such an infinity of beauty, where we cannot trace the slightest necessity or utility for it? Why might not all men have been born colour-blind, and, except for the enjoyment of the beauties of nature, been quite as well adapted to do all the work which God sets man to do here? This is the more striking a question, when we consider the extraordinary fact that men who are born colour-blind go on for years and years without knowing it, until some striking fact communicates to them the knowledge that they do not see the colours that their friends in general do. I have one friend who never discovered that he was colour-blind until he was taught drawing at school. He went through the work of drawing in pencil and in Indian ink quite well; but when a landscape subject was given him to paint, he astonished the master by painting, what should have been an intensely blue sky, a very bright vermilion: he did not know the difference between the two. Another friend of mine was intended to be an artist, but it was discovered that he could not paint. He then went to one of the first oculists of the day, and asked him how far his colour-blindness extended. It was found that he could not distinguish any shades of blue or green from scarlet and pink. I

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have seen him stand before a picture of nymphs bathing in a pool surrounded by some very beautiful gradations of foliage. My friend could not distinguish the flesh from a deep vermilion, nor from the colour of the foliage. I only mention this, to show that things which may appear to us, from our ignorance, to be useless or worthless, may have a very important bearing when considered with regard to God's design for the enjoyment, or for some other uses, of His creatures. I must again, before I sit down, thank Mr. Henslow for the exceedingly reverent tone in which he has discussed this subject.

Mr. Henslow.—I thank you all very much for your candid criticisms, and I feel that my paper has not been so severely dealt with as I anticipated that it would have been. Mr. Row has said that evolution does not necessarily involve atheism, and with that I quite agree; for I do not see any necessity at all for the one involving the other. Mr. Reddie has found considerable fault with my paper for purposely assuming that evolution was true; and perhaps from some of my statements I have been thought to be a believer in that theory——

Mr. Reddie.—I objected to the hypothetical argument.

Mr. Henslow.—That is perhaps a just objection, but the paper has been written on this plan (and it is too late to alter it now)—on the assumption that the theory was believed in; and my object was to endeavour to admit those views, and yet to show by the analogies I find in the Scriptures, that I do not think Darwin has any grounds for denying design, or another philosopher for denying the use of prayer. With regard to evolution itself, I do not think that it is inconsistent with theistical views. If true, it infinitely exalts rather than diminishes the power of the Deity. Surely it is a far higher conception of the Deity to believe that He has infused into nature some mysterious forces by which all the beings which He has created can be worked out and developed into higher forms. It seems to me infinitely higher to be able to do that, than to create everything at once and in an analogous way. Mr. Row has alluded to the argument of the watch, but I would go a step further than Paley. Paley says that it would still further exalt our ideas of the artificer, if we could suppose that he had created a watch which was capable of producing a similar watch out of itself. But if we follow this line out, we must suppose not only so much, but a watch capable of producing generation after generation of other timepieces, differing slightly from each other, until at last we have developed the whole series of clocks and watches which are to be found in the world——

Mr. Reddie.—You are assuming that. I want to know how you can reconcile it with the exaltation of the Creator, if you suppose that the watch *He* first made was inferior, but that *it* can produce better watches from itself afterwards?

Mr. Henslow.—I will come to that presently. Mr. Reddie has referred to one or two epithets and phrases in the paper to which he takes exception. On this point I am bound to confess that the paper was somewhat hastily drawn up, and I must plead guilty to several inaccuracies to which Mr.

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Reddie has called attention. With regard to the expression "God's ways are not our ways," I have quoted that twice; and one or two gentlemen have found fault with me for it. I may have adopted the words and made them applicable to my own purpose, and perhaps that was wrong. As to anthropomorphism, Mr. Reddie rather found fault with me for avoiding anthropomorphic language as far as I could. If we are to attempt at all to speak of the Deity and His ways, we have no other language but the human one; and we cannot help speaking anthropomorphically, as the Bible does throughout. But I especially avoided that. I have done it before, and I have been found fault with for doing it——

Mr. Reddie.—On that point I was really answering Mr. Row.

Mr. Henslow.—With regard to evolution, I did not anticipate the necessity for going deeply into it; but if you take the statistics of scientific men, you will find that a majority of them would be in favour of it. Both Mr. Reddie and the Chairman used the word "proof" a good deal, in regard to matters where there is no proof at all, and which are not capable of it. But are there not some things which can be believed on other grounds? Undoubtedly if you could have demonstration, you ought to have it; but there are such things as probabilities, and there may be every degree of probability from zero up to moral conviction, as Bishop Butler says, where there is no proof at all——

The Chairman.—I quite admit that probability may be so strong as to amount to proof, but you have not established even probable evidence.

Mr. Reddie.—That is the only proof I thought of. I did not mean mathematical demonstration, which is out of the question.

Mr. Henslow.—Then the question is, what evidence have we got to support the theory which will make it probable? I think that can be arranged under several heads. Take geology. Our Chairman went into that, and argued that geology does not support progression in the animal and vegetable kingdom. But what do we find to be the case? We find that the lower animals are at the bottom of the series in the scale of creation, as shown by geology, and as we come up we find the higher ones coming in one after another——

The Chairman.—That has been denied by Huxley himself, and it is a point which even Darwin felt he could not stand upon. He feels that the successive creation theory is gone. Year after year geology is going in a contrary direction to that theory.

Mr. Henslow.—I do not think Sir Charles Lyell is of that opinion yet; but at any rate I am not very well up upon this subject, and I do not like to speak dogmatically. I have not read Huxley's latest argument; but so far as I understand opinions now, I do not think these theories have been set aside. Take the development in vegetable life. You have the lowest forms coming on before the higher ones, and that gives some ground for an argument founded upon analogy, as is shown by Herbert Spencer in his work *On First Principles*. As to pangenesis, which our Chairman has referred to, I will not say whether I believe in it or not (hear, hear); but

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evolution and variation do not depend on pangenesis at all. There may be some other cause at work of which we are ignorant; and although you were to show that pangenesis is utterly inadequate and unreasonable, that would not prove that evolution must fall to the ground——

The CHAIRMAN.—My argument was that the theory of evolution would not do, unless it were supplemented by pangenesis, which in point of fact, as put forward by Darwin, contradicts his previous theory.

Mr. HENSLOW.—Well, but evolution does not even depend on Darwin. Evolution is not necessarily Darwinism, although the two words are much interchanged. Darwin may have his theory, which generally may be more reasonable than any other, because all the other theorists have given theories to account for other theories, while Darwin has contented himself with facts, of which he does not know the cause. (Hear.) The other theorists got ridiculed and laughed at; but Darwin merely argues from facts—the facts of natural selection, of development, of cultivation, and so forth. His theory, therefore, does not rest upon any one single fact that you choose to select; but there is an accumulation of evidence from various quarters, and arguments from analogy. For my own part, I think evolution is the best theory which has yet been propounded; but I would not go with Darwin and say that the hand of God has not prepared it before. With regard to the Fall, I will not enter upon that question; but it has always seemed to me most mysterious how nature is affected by that. Take the carnivora: how do you get over the difficulty created by the fact that man was not created till long after they had been in existence? If geological evidence is trustworthy, they existed long before man lived——

Mr. REDDIE.—That is a question.

Mr. HENSLOW.—You do not think so?

Mr. REDDIE.—Not at all.

Mr. HENSLOW.—Well, I do. With regard to man himself, I have put in a sentence, "if descended from the quadrumana." I put that in simply as an hypothesis. The words used are so remarkable that I think they have the stamp of genuineness—that man was called in by a special creative act. But there are rudimentary organs in man; how do you account for them? As matters stand, evidently man was formed on the same plan as the quadrumana. Whether man was developed from them with the assistance of a special creative act or not, no one can say; but man's immense powers, intellectual and otherwise, place an immense gulf between him and the highest ape, and prove his special creation. (Hear.) How rudimentary organs came about I cannot undertake to say——

The CHAIRMAN.—If you admit that you admit the whole. You admit that these rudimentary organs occur in a special creation.

Mr. HENSLOW.—I say that there was a special creative act when man came in. Those rudimentary organs do, I admit, form a great difficulty. The existence of those rudimentary organs would point to man's development, and that is the argument I presume that a thorough Darwinian would hold to, but the words of Scripture seem to me to point to some

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special interference in the creation of man. (Hear, hear.) Whether he was developed or not, I will not undertake to say. As to the word "perfection," of course that cannot be defined, and each person may have his own particular view of it. Take a crystal. You may suppose a body to be mathematically correct in every angle, and the material and form so arranged as to be perfectly transparent and without a flaw. But how often do you find a crystal which answers to that description ?——

The CHAIRMAN.—A crystal may be perfect even though it is quite opaque. Its perfection has nothing to do with its colour. You are going back to the derivation of the word crystal.

Mr. HENSLOW.—No. I was merely assuming in my own mind that a crystal ought to be transparent. I simply mean a crystal that should be perfectly transparent. How often do you find a perfectly transparent crystal ?

The CHAIRMAN.—You are introducing another element altogether.

Mr. HENSLOW.—Well, take one that is not transparent——

The CHAIRMAN.—I do not think you would find imperfect crystals at all.

Mr. HENSLOW.—But I should find many that I should call relatively imperfect. It is merely a matter of terms——

The CHAIRMAN.—You may find an imperfect crystal, if you find that it does not give you a mathematical shape, or what you conceive to be a mathematical shape. But even taking that view, I can give you many perfect examples. It would not follow that they would be imperfect. The perfection of a crystal depends upon its structure and the mode in which the particles are arranged.

Mr. HENSLOW.—Without any interfering elements combined with it—no specks of minerals interfering, for instance——

The CHAIRMAN.—There is nothing abnormal or at all corresponding to disease in their structure.

Mr. HENSLOW.—But you said that there was no imperfection in the mineral world. Mr. Row alluded to an earthquake, and asked whether that would be an imperfection. It may be an imperfection——

The CHAIRMAN.—The word "perfection" is often used erroneously, but it is not always possible to have exact definitions in such a discussion as this. Even mathematical definitions are only perfect so long as you deal with ideal abstractions. A mathematical fluid or a mathematical solid has no representation in nature ; and if you were to search for them in nature you would not find them. The same thing applies with regard to perfection. Perfection can only exist as an abstraction or as an attribute of the Deity.

Mr. HENSLOW.—I maintain, as you do, that if you take the mathematical idea of perfection, you do not find it either in the mineral, the vegetable, or the animal kingdom. If you say the adjustment of organic life to the material world was ordained by God, then I would say that an earthquake would be a relative imperfection——

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The CHAIRMAN.—It is not, unless it is the introduction of something abnormal. Now an earthquake is quite normal.

Mr. REDDIE.—In the paper before us it is not merely said that there is imperfection, but that "nothing is perfect."

Mr. HENSLOW.—A discussion on this subject would carry us on till to-morrow morning. I have to thank Mr. Titcomb for his remarks on the second part of my paper. I do not think that the real object of my paper, as embodied in that second part, has been really controverted, even if my remarks on evolution are not satisfactory. Even assuming that Mr. Darwin's theory of evolution is true, I think that the views of those modern philosophers and materialists, who deny the efficacy of prayer, have no good grounds to stand on. To make out that has been the sole object of my paper, and every gentleman who has spoken has concurred with me upon that point.

The meeting was then adjourned.

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ORDINARY MEETING, May 17, 1869.

The Rev. W. Mitchell, M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Rev. Mr. Garbett read the following paper :—

THE RESPECTIVE PROVINCES OF THE OBSERVER AND THE REASONER IN SCIENTIFIC INVESTIGATION.—By the Rev. Edward Garbett, M.A., *Mem. Vict. Inst.*

I SUGGEST the subject of my paper this evening as a trifling contribution towards the third object stated in the programme of the Victoria Institute, "To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which science is now divided, in order to get rid of contradictions and conflicting hypotheses." A slight extension of the meaning of these words will include the object I propose to myself to-day. For, strictly speaking, scientific conclusions, to whatever branch of inquiry they may belong, can never contradict themselves or each other, or stand in need of mutual adjustment. It is only when from conclusions we pass to hypotheses, that we find contradiction and conflict. The diversity is with science; for just so far as diversity exists, error exists somewhat. In science, properly so called, there can be no error, but it is in the various opinions held on the subjects of science, and yet more among different sections of men of science, especially in regard to the bearing of their particular branch of inquiry upon the province of religion. In proportion as science does its work, the diversity must diminish, and could we suppose the work ever to be completed, it would entirely disappear.

The parties to these disputes may be divided into three classes. At one end stand men of science who respect the Bible and its teaching, and who hold the results of science to be totally inconsistent alike with its historical credibility and

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its revelations of doctrine. Next comes the class of scientific men, who maintain, side by side with their love of science, their belief in the divine origin of Christianity, and the authority of the Bible—men as devoted to the pursuit of knowledge and as eminent in the ranks of investigators, as diligent, as laborious, as able, as any which the annals of science can boast. But beyond these comes a third class, who have no claim to be men of science in the ordinary sense of the word; who are interested in it just as they are interested in every other branch of human knowledge; who carefully watch its results, but who in their special sphere are moralists, not philosophers,—theologians, and not men of science. In the first class we have science without religion, in the second we have religion and science combined, and in the third we have religion without science. In each class there will be considerable varieties of light and shade. In the first there may be wide differences as to the degree of scepticism to which men have been led, and to the intensity of it, from positive infidelity up to negative indifference. In the second there will be found no entire accordance as to the relation between the Bible and science, or as to the mode of which their apparent and superficial contradiction may be necessitated. In the third the feelings with which physical investigation are regarded may vary, and the degree of intelligent conviction with which science is distinguished from some men of science, may admit of indefinite shades. But still the general division holds good, and the lines of distinction are sufficiently clear for my purpose, whether the man of science who is not religious, and the men of religion who are not scientific, and the class which stands beside, of men who are both scientific and religious. It must also be remembered that the two last may very often coincide; and the list of names belonging to the Victoria Institute presents eminent examples of the coincidence; the theologian and the man of science may be one and the same: but for my present purpose it will be well to consider them as distinct.

My object is to adjust if I can the relation of these three classes towards each other and reconcile their claims. At present, when the theologian ventures to express an opinion on a point of science, or to denounce the scepticism of men of science, he is regarded as an interloper into a sphere where he has no right to enter, as a fanatic who feels, not thinks, and as arrogantly pronouncing on matters on which he has no competence to form an opinion. No doubt equally strong sentiments are expressed on the other side, on the part of the theologian toward the scientific inquirer,

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and are open to the same rebuke. But I am here this evening, not as a man of science, but as a clergyman, and I must speak, therefore, from a clerical point of view. I do it the more, because personally I entertain no fear of science, nor have I the least wish to draw too strong and broad a line between science and religion. It is not science I fear, but the mistakes current under the name of science. I am told that science has disproved the Bible. I reply with a simple denial that I see no contradiction between the conclusions of science and the authority of the Word of God. I am told that I am not competent to judge, because I am not a man of science. I maintain that I am competent, and that competence I wish to defend this evening. For this purpose I wish to review the processes of scientific investigation, mark out the point at which the man of science and the theologian begin to part from each other, and assert the right of the theologian to interfere at this point of the process and to maintain an opinion of his own. In other words, I wish to mark out the respective provinces of the observer and the reasoner in scientific investigation.

It may be well to observe in passing, that both classes employ the same instrument, the reason, and that according to the same laws of the mind and the same principles of reasoning. The special influences of the Holy Spirit in removing obstacles in the way of conviction, in giving vital force to truth, and a realization of unseen things, which is almost a sight of the invisible, I now leave out of the question. I am able to do so, because the work of the Holy Ghost is no violent and abrupt disturbance to the order of our nature, but is wrought in strict accordance with the principles of its constitution. The Creat ordoes not shatter His own work when He gives it higher life; He only keeps the entire machine in healthy motion, through its ordinary modes of conviction, affection, character, conduct. The theologian exercises the same instrument of the intellect in his province of inquiry, as the physical philosopher does in his. Faith without grounds on which it rested, would not be faith but superstition; the theologian no more ignores reason on his side than the man of science is able to do without faith on his.

Not only so, but there is a very strong resemblance, if not an exact identity, to the mental processes employed by the two classes, however different may be the materials with which they deal. They both use the same instrument of induction which has been the great key of all modern discovery. I do not enter into the nice questions which have been raised relative to induction and deduction, but use the

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word to express what Mr. Lewes calls experimental reasoning, in contrast to that which is speculative and hypothetical. For instance, both parties begin with facts. In physical inquiry these facts are the outward phenomena of the visible world; in religion they are the evidences, external and internal, historical in the one case, moral in the other, on which Christianity is believed to be a revelation from God. Both need to take care that they know all the facts bearing on the point under examination, or else all their subsequent conclusions will be vitiated. Having got their facts, both proceed to generalize from them, a law of nature being the result in one case, a revelation from nature's God the result in the other. In passing on from one stage to another, both embody their conclusions in technical propositions for the sake of convenience, and in turn embody these propositions in single words; as when the man of science talks of gravity or electricity or chemical affinity, and the theologian talks of the Trinity, of faith, of justification, and so on. Thus both form a terminology of their own, each word of which is linked back by a connected chain with the original facts constituting the starting point of the inquiry, and which in both cases are equally liable to be corrected by fresh facts, if fresh facts are to be found, or by more accurate conclusions from old facts, if there should be reason to modify the conclusions of the past. And lastly, the facts are equally worthy of confidence in both cases, when they have been once proved to be facts. The process of proof may be more difficult in one case than another; although I see no reason to suppose the verification of a fact in history to be more difficult or to be surrounded with greater elements of error, than of a phenomenon in nature. But at all events, the facts once proved are as certain in the one case as in the other, and the conclusions to which they justly and necessarily lead, are as worthy of implicit acceptance.

But while all this is true, it is insufficient for my present purpose. For there are such unlimited capabilities in our nature that special mental aptitudes for this or for that may either be possessed by natural gift or be developed by constant practice into a marvellous perfection. The fact is familiar in regard to the body. I have been told by a very eminent preparer of objects for the microscope that his eye from incessant practice has become actually microscopic, and that he can now detect defects with his naked eye which at one time he could own deal with by the aid of a powerful glass. The same thing is true of the mind. It may consequently be said that the man of science has developed a

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peculiar aptitude, which enables him by a peremptory instinct to draw conclusions and predicate results which other men may be incapable of seeing. I most fully admit the existence of peculiar mental aptitudes developed in every branch of connected and consecutive study, and existing within their respective spheres, in the lawyer, the theologian, the preacher, the musician, the statesman, the man of letters, as well as in the man of science. But I wish to point out that these special aptitudes exist within very strait limits. They have their definite sphere beyond which they cannot pass. There is a stage in the process of scientific investigation where they cease, and the question passes to a broader sphere, where all men have equal liberty of entrance; the moment the investigation has reached this stage, the man of science ceases to possess any special apparatus, any extensive aptitude, any peculiar instinct, any royal road to his conclusion. Not only so, but it may be questioned whether he has not special disadvantages, and whether the peculiar habitude which was of immense value to him up to this point, does not become a positive hindrance beyond it.

Let me rapidly sketch the mental processes involved in scientific investigation. First comes the observation of the facts; and for this high and peculiar mental gifts are needed. To teach how to observe, and how to observe accurately, is one of the prime objects of modern education. The one fact must be separated from the thousand other facts among which it is embedded. Both incessant practice and a wide reach of knowledge, that is of accurate acquaintance with other facts previously known, are necessary for this. I have known a person accustomed to walk through the country without the slightest consciousness of any difference between the foliage of one tree or of another, yet that person would have detected a false note in music which a less cultivated ear would never have noticed. I have often found myself incapable of distinguishing between two ferns of somewhat similar appearance, because I have not been familiar with the names and exact structure of any one—the difference of one stratum from another, or the recognition of anything peculiar in the relative position of strata; the distinction between one bone and another of a fossil of an extinct species from another fossil of an existing species—are common and familiar instances where a trained habit of observation immediately and confidently perceives what is wholly hid from an eye untrained. Some men perhaps would scarcely know what is meant by the fact of flint implements being found in drift; that a certain heap of flints have really been fashioned, however rudely, by

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the hand of intelligence, and have not got their shape from natural causes, is a conclusion which a trained geologist alone would be competent to form. In some cases the recognition of a fact may require the highest skill and knowledge. It is not in the power of any one to use a microscope—the blundering hand of a neophyte may scarcely be able to present to the eye the commonest object with an instrument which in other hands may suffice to reveal the deepest secrets of that mysterious organism which has hitherto been found to pervade all matter. It is not the magnitude of the telescope, but the skill of the user of it, which brings the secrets of the heavens within human reach. The aberration which caught the notice of the astronomer Adams, and led to the discovery of new planets, was no fresh fact, yet none had discovered it till then. The observation of facts tasks, therefore, mental powers of high character, and can only be effectually done when a natural gift is developed by incessant practice into an exquisite mental sensibility. There is needed in addition the genius which can grasp the value of the fact, and by a rapid intuition seize its meaning. The steam of the kettle which led to the discovery of the steam-engine, the fall of the apple which suggested the law of gravitation, had been watched by countless thousands of eyes before those of Newton and Watt. Then, moreover, a fresh process of rigid examination is needed to eliminate possible causes of error. Those who remember the first outbreak of the table-turning mania may find an illustration in that ridiculous epidemic. That tables turned was a fact patent enough. Faraday proved that their turning by a physical impulse was a fact likewise, but till his practised habit or experimental observation was brought to bear upon it, fear and wonder and superstition had magnified one of the simplest of facts into one of the most inexplicable of miracles. And lastly, when single facts have nearly been ascertained and valued, and possible causes of mistake eliminated, there is still needed a wide aggregation of facts before any general conclusion can be justified by them. The whole world must be ransacked, and it is hard to say at what point the search must end, or when it is possible to pronounce that no fresh and unexpected facts will suddenly turn up to destroy the conclusions founded on the old. This has taken place over and over again—so repeatedly that the experience of the past teaches the most excessive modesty and caution in the future. Little more can be said than that in the present state of our knowledge, that is, of our acquaintance with facts, such and such things are probably true.

After saying thus much I shall not be suspected of under-

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rating the gifts required for an accurate observation of nature or of depreciating the lifelong labours of the eminent men who have become distinguished in the annals of science. And yet, after all, this knowledge of facts is not the first stage of the process. It is but the collection of the materials, not the putting together the data out of which the fabric of ascertained scientific truth is to be constructed. Two processes still remain of the utmost delicacy and difficulty, and full of the possibilities of error.

In the first place, the facts have to be generalized in the common truth represented by them, a truth equivalent to the facts; and neither falling short of them on one side, or exceeding them on the other. Thousands have failed in both ways, either drawing conclusions not justified by the facts, or failing to see the conclusion which is justified by them. The truth may be itself a fact, as, for instance, if it could be proved that the human race had existed on the earth for a period indefinitely longer than the Hebrew chronology. Or, it may be, what we call a law, that is, some uniform mode of the great Creator's working. But, in any case, directly we pass from the facts to the conclusion to be founded on them, we pass from the province of the observer to the province of the reasoner. They are two separate powers, and may exist together or may not.

But there is still one more process to be gone through before the investigation is complete, and this likewise belongs to the reasoner, not to the observer. The conclusion at which I suppose ourselves to have arrived in one branch of inquiry, has to be compared with conclusions arrived at in other branches, and to be adjusted into its proper place in the whole harmonious fabric of truth. First it has to be compared with the fixed conclusions arrived at in other branches of inquiry, for the purpose of ascertaining whether it is harmonious with them or not. For instance, suppose the conclusion which the scientific inquirer has arrived at to be the remote antiquity of man, his presence on the earth at past periods indefinitely distant. We must ascertain whether this conclusion can be held consistently with other conclusions in other branches. For as the Cosmos is but one, and all its parts so intimately related that they can be distinguished but cannot be separated, so intimate is their action and reaction, so close and complicated the threads that hold all created things together, so true knowledge can only be one. It must be consistent throughout. It is inconceivable that one and the same thing should be true in one branch of inquiry and untrue in another. No conclusion can

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therefore be admitted into the fabric of our fixed and ascertained knowledge, till its consistency or inconsistency with other parts has been ascertained. Other witnesses must be examined besides itself. It cannot be accepted on its own testimonial of character. Its final adoption must, therefore, depend on the presence or absence of conflicting principles gathered from other domains of inquiry. It must be reconciled with other parts of our knowledge before it can take its recognized place in the fabric of science.

Now it is by no means an easy process to ascertain this consistency or inconsistency. It demands not only a wide survey of truth, but very accurate habits of reasoning. How readily a mistake may be made here may be seen from the proposition to which I have already alluded more than once as a good typical instance of all this class of questions,—the alleged antiquity of man upon the earth. At first sight, the instinct of ninety-nine persons perhaps out of a hundred would conclude that such a fact is wholly irreconcilable with the truth of the Christian Scriptures. But more careful thought modifies such a conclusion,—there is, I believe, not the slightest contradiction between the statements of Scripture and the remote antiquity of man, should it ever be scientifically proved, so long as it is not shown that there is lineal descent between the men of past epochs and the men of the present epoch. The Bible simply contains the history of one particular race, lineally descended from one man and woman, and nothing else. Whether there may have been, or may not have been, other races of similar structure and constitution, is a further question of which the Bible says nothing one way or another. The matter will not be thought so improbable, if there be truth in the belief of some men that angelic beings have bodies in some sort similar to our own, only incomparably more ethereal. At all events, the antiquity of man would involve nothing on the face of it contradictory to the literal truth of the word of God. No doubt it would modify many popular notions, but this is a very different thing. To modify groundless interpretations of the word, is an office to which science may very properly aspire. It has done so already in some very familiar instances, and may do so again in many more, perhaps more than we have at present any idea of.

But suppose this process completed, and the matter determined, that this particular conclusion of science is irreconcilable with the conclusions formed on other branches of inquiry. For instance, suppose the antiquity of man upon the earth to disprove the credibility of the Christian Bible,

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what then?—is the matter wholly settled? By no means; we have a case of conflicting conclusions—one branch of inquiry has led to the conclusion that the Bible is untrue. But it is not to be forgotten, that another branch of inquiry has led equally decisively to the conclusion that it is true—the man of science and the theologian both starting from facts—facts widely different in their material, but equally cogent in their proofs; both using the same common instrument of the reason; both using it according to the same processes; both testing their conclusions by experiment, flatly contradict one another in their conclusions. How is it to be settled? The man of science demands that the theologian should give way, and applies to him some hard words if he refuses, and bases his demand on the specific ground that his own process is a process of science, and that science cannot be wrong. But in the first place he omits to notice that he may be right in his observations, and yet wrong in his reasoning from them, and that errors in reasoning, whatever their exact character, are not scientific, but eminently unscientific. These mistakes are not the mistakes of science, but the mistakes of an unscientific mode of pursuing science. Moreover, in the highest and strictest sense of the word, all processes of inquiry, if they are properly and accurately conducted, are scientific. Science is only a body of organized knowledge, whose phenomena are arranged so as to exhibit the reasons and causes by which they are influenced in their legitimate connection and interdependence. Abstract science possesses as true an inheritance of the common name as natural and physical science. There are ultimate principles and causes at the basis of all the forms of mind, as well as of all the forms of matter. To claim special privileges or a peculiar infallibility for physical inquiry over mental or metaphysical inquiry, is not a fallacy of popular ignorance, but another illustration of the very fact I am seeking to establish, the dependence, namely, of the observer upon the reasoner. But if this be true, and if an induction from historical facts be just as scientific as an induction from physical facts, and depends on exactly the same conditions, there can be no imaginable reason why the conclusion of the theologian should be submitted to the conclusion of the geologist, more than the conclusion of the geologist to the conclusion of the theologian. The theologian may rather claim the higher degree of certainty than the lower, inasmuch as his conclusion is ratified by the experience of moral and spiritual instincts and events, of which the conclusions of natural science are necessarily devoid.

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What then is to be done with this conflict? Why, in the first place, the processes on both sides must be re-examined and worked out over and over again, to discover, if possible, where the human mistake lies. And finally, if this cannot be discovered, we can only conclude that the reason of the apparent contradiction lies in our imperfect data, our incomplete knowledge of facts, and that, in proportion as this want is supplied, the conflict will diminish and finally disappear.

Thus it appears that the processes of scientific investigation are about equally divided between the observer and the reasoner. All the collection of the materials of reason, of the data on which the premises rest, depends upon the observer. Into this sphere the untrained mind has no right to enter, and it would be presumptuous for any but a man of science to pronounce an opinion. Within this sphere we must trust to Christian men of science to check and test by every rigid method the observations of the sceptical man of science. But the province of the observer, and consequently the sphere of his peculiar technical aptitude, close with the collection of the materials. Here the province of the reasoner begins, and here the scientific explorer has no advantage whatever, and has no right to claim any. The minute concentration of mind upon details must rather tend to contract, and thus to weaken, the thinking powers, and destroy that breadth of view, and that patient testing of an argument, link by link and premiss by premiss, which constitutes the strength of the reasoner. To say the least, there is no special advantage, and to assume the authority of science for all the conclusions formed in matters of science, is folly. There may be as much bigotry and fanaticism in the geologist, the chemist, or the astronomer, as in the theologian; yet it must be evident, in a process when observation and reasoning constitute two connected, independent, yet closely affiliated processes, that a mistake in one half of the processes is as fatal to the conclusion as a mistake in the other. No weight of authority can make a bad argument into a good one, or can convert an assumption into a proof. Into the proper province of the observer it would be presumption for a stranger to tread. To take, for instance, Mr. Darwin's book on the origin of species, I should not dare to pronounce an opinion on his statement and classification of facts, but when he begins to reason I hold myself as competent to judge whether his facts support his conclusion, and whether his conclusion be consistent or not with our ascertained knowledge in other provinces of inquiry, as he is himself.

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Thus it appears that the claim for a peculiar certainty advanced by the votaries of physical science, is to a great degree imaginary. The certainty of the data does not involve the certainty of the conclusions. These stand on open ground, where every candid reasoner has a right to think and judge for himself. It has been observed with wise caution, and with these words I conclude,—"The great majority of what are called sciences — that is, all those branches of knowledge in which discovery is possible—hardly deserve the name, being only a bundle of theories or facts, bound together with more or less exactness, and which a fresh discovery may any day untie."

The CHAIRMAN.—I need hardly ask you to join with me in returning thanks to Mr. Garbett for his valuable paper. I only hope that it may elicit some discussion, and with that view I now call upon any gentleman who has any observations to make.

Mr. REDDIE.—Before the discussion commences I should like to ask the author of the paper what element he refers to as being common throughout the whole creation. I do not know whether he refers to the new thing called "protoplasm."

Mr. GARBETT.—I do not think I used that phrase at all. If you will find it in the paper I shall be obliged.

Rev. C. A. ROW.—I feel a considerable difficulty in entering upon this subject, from the fact that I have not yet seen the paper in print; and a paper of this kind I should be sorry to attempt to discuss, unless I had had the advantage of reading it carefully beforehand, as I am certain that I could not do justice to it. There are one or two small matters, however, in the paper, which I will just mention with these few words of preface; because I feel that I have no right to discuss a paper of this kind unless I have previously given it a careful looking through, as I should be in great danger of making mistakes. I think I agree generally with the purport of the paper; but it strikes me that Mr. Garbett must admit this much: He has laid it down, and I fully concur with him, that there is a great importance in skill in every department of human thought. But I think he must also admit that though the physical philosopher may be the exclusive judge of facts because of his skill in investigation, we must extend that principle into the reasoning faculties as well. No doubt there are many persons who are really incompetent to judge of the processes of reasoning. The paper is rather loose there, because Mr. Garbett seems to lay down that most of mankind have an equal power in judging of reasoning and its conclusions. Here I think there is an unquestionable looseness, because it does not always fall to the observer of facts as facts to be able to reason accurately from them. Many people would have us believe that because they are clever at one thing they are also clever at another,—a conclusion which, in many cases, I altogether dispute. On certain points which I have studied deeply I am entitled to give an opinion;

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but there are certain others on which my opinion is worth nothing. In the same manner I apprehend that the power of the mind in judging of the evidence of facts, and in reasoning from those facts, form two distinctive branches of skill. This is rather obscure in Mr. Garbett's paper, and I hope he will explain it more fully. He seems to me to have used the term theology in a very general sense, but I understand him to apply it to the evidence on which revelation rests. Is that your view or not?

Mr. GARBETT.—I did not mean to limit the term to that application, but simply to show that that evidence is the first step.

Mr. ROW.—Of course there is no doubt that in theology as in nature there are facts on which alone theological science can be based, and if we do not base theological science upon them we are nowhere. I quite agree that the utmost which science can do, will be to explode a number of theological theories which are not really theological at all, and which do not belong to the Bible, and the sooner they are got rid of the better. But where I see a great difficulty is in this: theological science is so extensive, and it deals with so many phases of the human mind of a high character—metaphysical, for instance,—and many other things, that we have a greater difficulty in ascertaining the ultimate facts of the mind than in ascertaining the facts of nature. Take such facts of nature for instance as time and space. They are clearly determined as conceptions; but in theology and morals we have to make a very careful analysis of the mental processes by which we arrive at them and at the general truths contained in them; and it is that, I apprehend, which makes theological science a matter of much greater difficulty than simple physical science. Theology consists of a number of sciences of a kindred character: it is of no use to speak of it as one science. It includes metaphysics, deductive logic, and the ascertaining of facts as conveyed to us by revelation, by instituting an exegesis suitable to find out the precise meaning of the Biblical language. This is one of the great defects of the paper, and I should be glad if Mr. Garbett, in his answer, would explain more fully the theory which he has in his mind. I do not know if I have clearly expressed what I meant, but I should be glad if in his written answer he would elaborate this point. I think the paper would then be much more clear——

Mr. GARBETT.—I did not mean to put all men's reasoning powers on the same level; but I wished to separate them into two classes—the scientific observers, and the reasoners who were not scientific.

Mr. ROW.—There I certainly agree with you. I quite admit that reasoning is entirely distinct from the observation of facts, and that a close attention to the observation of facts does not qualify the mind for reasoning; but then at the same time there are diverse classes of reasoning. I do not think, that, on the whole, mathematical reasoning qualifies the mind for reasoning well on moral subjects; and I do not think that men who confine themselves to pure mathematical subjects are found, as a rule, to be good or correct reasoners on moral subjects. Mathematics contain evidence of a highly demonstrative character, but they do not require us to enter into the minute

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considerations which form so large a portion of all observations founded upon moral subjects.

Rev. J. H. TITCOMB.—I would not offer a word of criticism upon this valuable paper on this or that particular point; but I must say that I was extremely pleased with the able way in which Mr. Garbett stated that true science could contain no error. I think we cannot possibly overstate that fact. You see the truths of science come from God, and the truths of revelation alike come from God. God must be the author of both, and if the one be infallible the other must be infallible too. For instance, I would not mind saying, even in the pulpit itself, if the occasion demanded it, that such a fact in mathematical science as that the squares described on two sides of a right-angled triangle are equal to the square described on the hypothenuse is no less infallibly true than that there is only one God. The two facts are equally true. This adjustment between revelation and science is necessary, because they come from the same author, and have a common origin and a common fulness. That thought struck me while the paper was being read. I was also very much struck with the value and force of what Mr. Garbett stated with regard to the importance of accumulating facts for the better ordering and subserving of truth in all the processes of experimental science. I think the history of geology shows that the gathering of a few facts and generalizing upon them may lead to much error in so-called science, or at all events to the adoption of an unscientific manner; and the addition of other facts afterwards may lead to other deductions, which may totally upset the previously formed views on the subject. Fossil remains have been found in a stratum which was thought at one time to contain no such remains; and things which a few years ago were pronounced to be unscientific are now possibly quite scientific——

The CHAIRMAN.—Or are supposed to be correct?

Mr. TITCOMB.—Yes. The accumulation of facts becomes more and more the handmaid to discovery; but for that we should go into the line of thought suggested by Mr. Garbett, concerning the great advantage of skilled or talented observation. I was very much interested with Mr. Garbett's observations regarding the microscopic power of the eye. If Mr. Darwin were here, we might call upon him to elaborate his theory of the origin of species, and to explain the power which he attributes to a body, of assimilating and developing certain organs and functions to a degree which did not naturally belong to them; and he would no doubt tell us whether the change remains permanent and continues from generation to generation or not——

The CHAIRMAN.—Certainly long sight and short sight are not hereditary.

Mr. TITCOMB.—As to Adams's discoveries, I understood Mr. Garbett to attribute them to the observation of other discoverers. I understand that Adams's discovery was arrived at from abstract reading; Leverrier's from actual observation——

The CHAIRMAN.—The real facts of the case have not been given by Mr. Garbett. Mr. Garbett assumes that Adams and Leverrier were both astronomical observers. Now, at the time Adams made his discovery, I

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doubt whether he had ever used a telescope for observation. The fact was that Adams was writing his planetary theory, previous to his offering the hint to look after the perturbations of Uranus ; the aberrations of which from the supposed known law of gravitation had been observed by observers, and could not be accounted for by the effect of any of the then known planets. The next question was, Suppose you start the hypothesis of an additional planet, will that account for it ? And he was supposed to tell Challis where to look for it, and Challis looked. The same process was carried out by Leverrier, with a hint of Adams's plan from Airy, who had the plan which Leverrier carried out ; for he was more fortunate in his observation, and found the planet. But Mr. Reddie was the first to draw our attention here to the fact which was established, that the planet was not discovered where it was supposed to be ; that the place where the planet was supposed to be and the observed facts were most discordant, taking the calculations of either Adams or Leverrier ; and that there was not that scientific agreement between the observations of the two distinct observers which was supposed to exist.

Mr. Titcomb.—As I see some young friends here, I think it important to make a few observations on the intense pleasure and profit which we gain through intelligence and reading. There are numbers of persons who toil painfully through the British Museum or the Kensington Museum for want of an intelligent acquaintance with the facts of the case before them, and the nature of the topics suggested to them by what they see. I never feel my own ignorance so much as when I go through certain departments of those vast magazines of science and learning ; but in certain departments I feel at home, and I have an intelligent enjoyment of them, because I can observe minutely, and see things which I otherwise should not be able to see. I never feel the importance of having thoroughly studied one department of knowledge so much as on such an occasion, nor the miserable consequence of not having had time to study the others. It is utterly impossible to study all, however ; and it is better to have a thorough acquaintance with one than a little knowledge of all. It is one of the advantages of a paper like this that we may learn to feel more and more that we never can know too much ; and that therefore we should try to take advantage of what we read on practical occasions, such as when we visit museums, in order to reduce our reading to practice, and gain fresh intelligence and enjoyment.

Mr. Row.—This is a strong illustration of the point maintained in the paper as to the difference between the observer of fact and the reasoner :—I do not see by what argument the physical philosopher is to infer that design does not exist because he is an observer, any more than I am to infer that it does. That is a point where observers get wrong, and go a step beyond their own province. It is a plain matter of pure reasoning whether design exists or not. To quote a person like Darwin—supposing that he denies it—is no authority that design does not exist in creation. He and other men of the same stamp are no doubt authorities in their own department, but when they go beyond that, and infer as part of their science that there is no such thing as design in creation, they get out of their province altogether. I

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think the paper which we have had read to us is very valuable for the purpose of concentrating our strict attention on this fact. It does not follow that because a man is eminent in one branch that he should be taken for a guide beyond that ; and I maintain most strongly that it is not the faculty of observation which enables a man to say whether there is design in creation or not.

Rev. A. De la Mare.—I quite agree with what Mr. Row has said this evening, that Mr. Garbett's paper is a most valuable one, and full of the most valuable material for our own thought when we shall have it printed and in our hands. But there is one point for which I especially thank Mr. Garbett, because I think he has clearly brought out what has led to so much misunderstanding in the relative position of theologians and scientific men. Mr. Garbett has stated distinctly that the theologian has as much right to faith on his side, as the scientific man has to demand to have evidence received from him ; or, in other words, that the scientific man can no more do without faith in carrying out his processes than we can do without reason. I only draw attention to that lest it should escape notice, because it answers an imputation which is often thrown out against theologians, that their processes are almost superstitious, resting on nothing but faith, and totally removed therefore from a scientific character. I thought Mr. Garbett's observation was very valuable, and I desired to mention the point lest it should not be noticed.

Mr. Reddie.—I am sorry that Mr. Garbett has left us, because I am afraid that I shall have to criticise his paper adversely on some points. With regard to the general scope of the paper, as an illustration of the object which this Society has in view, I think there will be a general agreement among us ; but when I now proceed to make some observations, not quite in accordance with Mr. Garbett's views, I may state that that is not fighting him in an unfair way, as he will be allowed, if he wishes, to reply to what is reported of our remarks. He commenced his paper by saying he would give a few instances to illustrate his general reasoning, but he was peculiarly unfortunate in those instances. We have already heard that the actual place of Neptune and the calculations of Leverrier and Adams did not agree in the least together. All the calculations have been published by Messrs. Walker and Pierce, of the principal observatory in the United States. The astronomers here, however, did not take these revelations very well, because there is an inclination among them to profess to be perfectly accurate in their science——

The Chairman.—Certainly one has heard very little of the great discovery since, as an example of astronomical accuracy. (Laughter.)

Mr. Reddie.—Without going into the history of that, however, I think it is easy to show, that there is considerable inconvenience from the observer and the reasoner being separately employed upon the same work, for I do not go with Mr. Garbett on that point. It is unfortunate that those who give us the mathematical laws of astronomy are seldom astronomers at all, while the astronomers who observe are often but indifferent mathematicians

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and seldom physicists. To the mathematician it is all the same whether the sun or the earth is in the centre—the calculations would be just the same in either case. I believe, *qua* mathematics, that is so; but if you place the earth in the centre, you have no longer to place the sun at so very great a distance; and the physical law which would serve to whirl the earth round the sun is a very different law to that which would be required to guide the sun round the earth. Of course I speak of this as not being an astronomer myself. The story of Newton's apple I believe is a complete myth. Ten years before Newton put out anything about the theory of gravitation—and I speak from papers to be found in the Transactions of the Royal Society which I have already quoted in this Institute*—ten or twelve years before Newton wrote his *Principia*, papers were read upon the theory by both Halley and Hook; and the story of the apple is even quite given up by Whewell in his *History of the Inductive Sciences*. It is in fact nothing more than an old nursery tale. As to the story of the steam of the tea-kettle being the origin of Watt's steam-engine, I doubt that very much——

The Chairman.—I always understood that what Watt discovered was the use of the safety-valve. He saw the lid of the kettle moved up and down by the force of the steam, and found a way of applying it to the steam boiler which was then in use.

Mr. Reddie.—But these are minor points. The other illustration which Mr. Garbett gives is as to the antiquity of man being reconcileable with the Scriptures; and here I must again say that I think it was unfortunate that he should put forward these opinions, considering that the subject has been amply discussed here already. I think the best of the argument rests with those who deny that antiquity. If we admit that Adam was not the ancestor of the whole human race, we interfere very naturally with the Bible——

Mr. Titcomb.—I must vindicate Mr. Garbett on this point. He only said that antecedent to Adam there may have been other races, and not that all the members of the existing human race have not descended from Adam.

Mr. Reddie.—That is a new idea. We have had many curious ideas with regard to the antiquity of man put forward, and this is another idea. I am always glad to hear these conflicting theories put forward, for they are utterly irreconcileable with each other; and while the theorists are fighting with one another about them, we need not bring the Scriptures to bear on the subject until they agree with one another, which will not happen for a long time to come. An instance of extremely fallacious reasoning on *quasi* facts took place with regard to the fossil man of St. Denise, discovered in some *débris* connected with the Auvergne mountain cones which were supposed to have been erupted long before the time of Noah's flood. But in our *Journal of*

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* Vide *Journ. of Trans. of Vict. Inst.*, vol. i. p. 413, *et seq.*

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Transactions it will be found that those theories have been refuted, and that the eruption of these mountains took place in the fifth century of the Christian era. Then there was the Neanderthal skull, supposed scarcely to be that of a man at all, but almost of the "missing link" between man and monkeys. There is something very analogous to the shape of that head in the Nova Scotian giantess who was exhibited in Piccadilly not long ago. But it was found by a careful observer, Dr. Barnard Davis, that that skull was merely an abnormal skull, and that disease had been at work upon it and had caused the peculiar frontal development which it exhibited. Nobody now believes that it was either a very ancient skull, or that there was anything Simian in its character; and, in fact, there never was any proof that the clay in which it was found was old clay. Mr. Garbett has told us that facts when ascertained should always be accepted. If they are facts, no doubt that is true enough, but the question most often is, whether so-called facts are facts or not. Many things which at first have been taken to be facts have been found not always to be relied on. Another thing which Mr. Garbett has said is, that the facts of history are not more difficult to be ascertained than are the facts of physical phenomena. Now I think it is most difficult to get at the true history even of one day's transactions. We know the wide divergence there was between the Federal and Confederate accounts of events in the American war; and we know also how completely we were, and are, at sea with regard to many of the events which took place in the Crimean war. And that being so, how we are to tell what took place in the histories of other nations before "our own correspondent" became an institution, I really do not know. As to natural phenomena, whatever is a fact once is always a fact, unless you deal with exceptional matter or miracles; and here is the great advantage of entering upon the study of natural science, for it should make us more accurate and careful, and we should never accept its facts without having them verified over and over again. Whatever was true to Copernicus, to Kepler, to Newton, to Darwin, or to any one, is the same always. You have the same elements that they had, the same natural world, and the same investigations may go on over and over again to eliminate the errors of previous philosophers. What is the history of science but a record of discoveries and the setting right of errors and mistakes, it being constantly found that what were put forward as facts at one time were really no facts at all? There seems a strange disposition on the part of Mr. Garbett, and on the part of others, to an unscientific mode of viewing these things; there is an inclination to separate the reasoner and the observer too completely from one another. Now I must say, that without reasoning a man would be but a very poor observer, and an observer would be a sorry man of science if he did not reason———

Mr. Row.—You must not confound two processes of reason together.

Mr. Reddie.—I think that all processes of reasoning are analogous——

Mr. Row.—There is inductive and deductive reasoning.

Mr. Reddie.—Quite so; but deduction is only extending the process of induction. There is no material difference in the character of the mental work.

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You must have your facts as a foundation; and you must not draw conclusions, whether deductive or merely inductive, beyond the facts which are there. There is too great a disposition on the part of men of science to cut up science into detached parts; and, like the mathematician who deals with a bit of astronomy instead of the whole, you get them entirely overlooking many important considerations, and this prevents them finding themselves to be mistaken. This is entirely because science is cut up in this way; for it is obvious that you cannot have two things true which contradict each other. Mr. Garbett was out of tune with the rest of his paper when he spoke of science and theology being at issue, because he began by pointing out that true science could not possibly be wrong. If there is an issue between science and revelation, it must be because that which we call science is not really science, or else we have some error in the revealed Scriptures. Now if it be proved by science that there were races of men created, according to Professor Macdonald's theory, whose descendants are still living in different parts of the world, or, according to the extraordinary and new theory of this paper, none of whose descendants are now living, I would say that equally in both cases there must be some error in the Biblical narrative. Those who have been accustomed to read of Adam as being the first man, and of all men dying in Adam and being renewed in Christ,—all Scriptural students would at least be startled if you could prove from science that there was a race of men of which the Bible seems to know nothing. But I do think that if instances are brought forward in a paper like this, they should be instances on which there is no disagreement at all; but in this case, with regard to the theories of the antiquity of man, there is the widest disagreement. There are hardly any two theories upon the subject which are at all reconcileable with each other. You should also consider the changing condition of geology, and remember that this theory of the antiquity of man is a deduction from a now antiquated geology, based upon fossil remains now found in different strata. As Mr. Titcomb has pointed out, you may have one theory, apparently supported by good evidence, in one year; and a year or two afterwards it may have to be entirely given up.

Admiral Fishbourne.—There is one point which I think has not had sufficient justice done to it, and that is the necessity for harmony existing through all branches of knowledge. God is the common author of all things, and I cannot see the necessity for any one who is studying one department of knowledge to assume, because he thinks he has got his facts arranged judiciously, that his deductions are exact, and that he is to ignore the contradictions between his facts and those of others. The last paper which we had read here is an illustration of the necessity for that harmony. The author of that paper spoke favourably of Darwin's evolution theory; and yet he was a theologian, or rather a clergyman, though I consider his argument was directly opposed to the whole of the Biblical scheme. Geology recognizes a flood, and has it stamped upon the strata of the earth; but how can a theologian point to the Flood or to the fall of man on the evolution principle? Any man, whether he admits the Scriptural doctrine of the Fall or not, must

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admit an imperfection in his nature. He does those things which he would not, and he does not do those things which he would, with a consciousness of imperfection and fault in his own character. But there is an utter want of harmony between the Fall and the idea of evolution, which shows that evolution cannot be true, and those who support that doctrine must go back and amend their arguments and so-called facts. But if we go back to the facts, we get back to other difficulties, which another class of philosophers take up. One says that protoplasm is one continuous principle that pervades all beings, but he forgets that the protoplasms are as numerous and as various and distinct as the beings are; and how he imagines one is transferred into the other I cannot say. I do not see how it agrees with Darwin, who says that man was originally a monkey, and the monkey something else, till you get down to one common monad. With regard to Mr. Garbett's paper, I agree, generally speaking, with Mr. Reddie; but I understood Mr. Garbett to put forward that point which Mr. Reddie so much objects to simply as a hypothesis, subject to the possibility of its being established; and I do not think Mr. Garbett should be tied down to the assertion of a definite opinion on the subject. I believe the theory is utterly untenable, and I should not have introduced it in such a paper, though I do not take great objection to its being so. I do, however, think that the case of physical philosophers has clearly established the position of Mr. Garbett, that there is a great and manifest distinction between the observer of facts and the reasoner who has to consider these facts. My experience has shown me that a man may be a very good observer of facts and yet be utterly incompetent to reason out general principles and laws from them. And when a man has a theory in his mind he cannot be a good observer; he is looking into the book of Nature merely to find supports for his theory, rather than to take the facts as he finds them. So it is with theologians. They look for things to support their opinions in the Bible in accordance with their views, overlooking many things that they might otherwise find. As to physical facts, Mr. Reddie has told us that so-called facts, accepted as facts some time ago by philosophers, reasoners, and good believers, have turned out to be no facts at all. A distinguished philosopher has published a book in which he says that he found infusoria and algæ and other things in volcanic rocks, and he insists that they are not volcanic but a crystalline or aqueous formation from stagnant water. That is a blow struck at geology, showing those gentlemen who want theologians to accept their views—which belong to a science of yesterday, whereas theology is the science of thousands of years—that they have gone through processes which have landed them in much error, a great deal of which was accepted by the theologians of a few years ago, whose reasonings, however, are not accepted now. But the state of things remains the same. Geology is a science of only yesterday, and yet those who follow it have the presumption to ask theologians of long standing, whose science has had the advantage of thoroughly testing and sifting every fault, and obliging errors to be given up, to accept their theories. This is a further reason why the theologian should stand his ground, and why the physical philosopher should be told to go

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back and re-examine his facts, with the intimation: "When you have gone through the fiery ordeal which we have gone through, we will listen to you."

Mr. Row.—Let me just point out one fact: I think that all are of opinion that the logic of induction and of deduction are two essentially different principles. Archbishop Whately attempted to resolve them into each other, but that was a failure. They are two essentially distinct principles—the logic of induction and the logic of deduction.

The Chairman.—I have only listened to Mr. Garbett's paper, which is of that character that it is quite impossible to discuss it fairly without reading it. I must say, therefore, that all the observations which I shall make must be taken with this limitation, that I shall not attempt to reply to the paper, but only cursorily examine what may have been the false impressions which I have received as to the nature of some of the illustrations. With the object of the paper I cordially agree; but there is a little vagueness in the manner in which the term "science" is used throughout. This is our great difficulty, that we find ourselves sliding into five or six different definitions of science in the same discussion. If we take science in its highest and purest sense as meaning true knowledge, which I conceive to be the only real and true definition of science, then I would most cordially agree with the paper; but I must go further, and say that I cannot distinguish between theology and science, because, in respect of all that is universally true, it will be found that theology is of all sciences the highest and purest, and when we examine it, it will give us the highest degree of proof of any science whatever. I am not afraid that the science of theology, considered strictly as a science, and considered strictly as a science arrived at by the operation of human reason, should be compared with any other science derived from human reason. Take an illustration of Mr. Titcomb's, though I will not go so far as he does. He conceives that it is absolutely demonstrable that if you have a right-angled triangle, the square on the side opposite the right angle is equal to the squares described on the other sides——

Mr. Titcomb.—I said absolutely true. I said nothing about demonstration.

The Chairman.—Then I misunderstood him. But I would say that the truth of the existence of the Deity can be proved by a higher mode of demonstration than that arrived at mathematically. The reception of a mathematical demonstration as a scientific fact must depend upon its demonstration, and that demonstration depends on certain fundamental definitions and certain fundamental axioms and postulates. All demonstrations in geometry depend on those first principles. If your first principles are open to doubt, all the demonstrations founded upon them are equally liable to doubt; and we find that no system of geometry has yet been conceived which has been able to proceed upon axioms which are demonstrably true, and admitted to be true as a kind of instinctive truth of the human mind. We are obliged in some form to assume some propositions which as much require proof as any of the propositions afterwards proved. Under these circumstances, I say that all geometrical conclusions founded upon geometrical reasoning and de-

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monstration must take with them whatever degree of doubt may exist in the original fundamentals of the science. This, I think, is a point which should be strongly insisted upon when what are called physical and mathematical sciences are brought into collision with the highest of all sciences—pure theological science. It is a generally received opinion—but I believe it is an opinion which is founded upon ignorance—that the mathematical and the physical sciences possess an amount of demonstration which is utterly unattainable in such difficult subjects as those which occupy men's thoughts when they enter upon the science of theology. I am sure of this, that the more the subject is investigated, and the more we analyze the principles on which those so-called scientific demonstrations in mathematical and physical science are founded, the more it will be found that we have as strong a proof and demonstration of the higher science as any that can be produced in any of the other inferior sciences. If the same degree of scepticism which has been brought to bear upon theology as a science were to be applied to any of the other sciences with which we have to deal, or any of those sciences which are supposed to be demonstrative sciences, I feel convinced that there are far greater difficulties to meet with in those so-called demonstrative sciences than any which theology has to answer. Now this is a subject which should be thoroughly considered. With regard to the distinction between the observing faculties of those who are called upon, when facts are observed, to analyze them and to arrange them, and the reasoning faculties of those who are to determine what is to be derived from them, I conceive them to be two very different faculties of the mind. They are both capable of being cultivated to a very high extent, and no man can become a good observer who does not cultivate the faculty of observation; and I agree with Mr. Reddie, that this also necessarily implies the co-existence of very considerable reasoning powers. But then I believe that it also requires a long education, and an education of a totally distinct character from that of the mere observer, for a man to attempt to deduce from the observed facts their general laws, or their bearing on the other facts of nature. I cannot help feeling, that while I agree in the main with the conclusions in this paper, I am very sorry that Mr. Garbett, as I conceive, has made use of illustrations which are rather faulty in themselves and which do not hold water. I think some of them came probably from an incorrect apprehension of some of the circumstances, as in the case of the reference to Adams and Watt. They were correct as illustrating Mr. Garbett's paper, but incorrect as not bearing on the supposed facts to which Mr. Garbett wished to refer. But it should be borne in mind that it is very difficult to become true observers of facts, and I could give an illustration which would go further than his. It is a matter of trained observation for a chemist to determine whether a fluid contains a supposed poison or not. Does this water contain arsenic, for instance? In such a matter, no mere tyro in chemistry should be trusted where a man's life is at stake, and men's lives sometimes do depend on the chemist's accuracy in such a thing. In one case a man was accused of committing murder, and among the bottles found in his possession was one containing a clear, trans-

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parent liquid. A strong suspicion arising from other circumstances, independent of the chemist's observation, that arsenic had been used as an instrument for committing the murder, it was the chemist's business to determine whether any of the bottles contained arsenic or not. Any one will admit that Professor Taylor can be taken as a good example of the trained experimental observer; but let us see what is required in him besides mere accuracy of observation. It was the case of Smethurst, which led to a great discussion at the time. Professor Taylor examined the fluid, which he subjected to a test which was conceived at that time to be a certain test to discover the existence of arsenic, and he went, and upon his oath, as a chemist before a coroner's jury, said, "I have examined this fluid, and I find that it contains arsenic": and he gave the quantity of arsenic which should have been contained in the fluid. Now we cannot suppose that a trained observer would be careless in such a matter, or that, when asked on a question of life and death, he would consider it consistent with his duty to state lightly on oath, broadly and distinctly, that a certain fluid contained arsenic. Between the coroner's jury and the trial of the man, however, certain doubts were suggested to Professor Taylor as to whether his analysis had been altogether accurate, and as to whether the fluid did really contain arsenic or not. What was the fact? He had made use of a certain test which was considered to be infallible. It consisted in this, that if a suspected fluid containing arsenic is mixed with a certain quantity of hydrochloric acid and boiled in contact with bright copper, that bright copper receives a metallic, silvery-looking stain, and it is the chemist's business to determine whether that stain contains arsenic or not by subliming the stain by applying the heat of a spirit-lamp until the stain evaporates, and little crystals are formed, and the chemist's determination depends on the form of the crystal which is deposited. When Professor Taylor took copper to analyze this fluid he used copper-wire gauze. He found that the fluid contained something which caused the copper wire to dissolve. He kept on adding copper until the fluid no longer dissolved it, and then he submitted the solution to the further process, saying, "Now I shall see whether the fluid will give me the arsenical stain or not." It did give it, and he said, "I put in so much copper; therefore it must contain so much arsenic." A suggestion was made to him—I believe by Mr. Graham, the late Master of the Mint—who said, "Taylor, are you sure that you did not put in the arsenic yourself? Have you examined the copper you used, and are you sure that it contains no traces of arsenic?" Professor Taylor upon that dissolved a piece of the wire gauze in a solution which he knew absolutely to contain no arsenic. He got the arsenical stain from that, and then he found that there was no copper which did not contain arsenic, and that there was not a particle of arsenic in the fluid he had analyzed. And he had the boldness and the honesty, when he came to that conclusion, to confess that he had been mistaken. That is one of those things which show how, as Mr. Reddie and Admiral Fishbourne have pointed out, what are supposed to be scientific facts turn out to be no facts at all. The fact to which Professor Taylor swore on oath was that the

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fluid contained so much arsenic. Now, to use Reinsch's test it was almost impossible to obtain pure copper, and when he attempted to do it by galvanic aid, even then it was difficult, for sometimes the electricity carried over from one pole to the other not only the copper, but the arsenic with it. What was it that caused Reinsch's test to supersede Marsh's test? Marsh's test was said to be the most delicate test for arsenic. But it was so delicate as to be almost useless, because it depended on your dissolving in nascent hydrogen the arsenic of your suspected fluid. You had to get your nascent hydrogen from two materials, zinc and sulphuric acid, but when Marsh's test was employed almost all the sulphuric acid of commerce contained arsenic, and so did almost all the zinc, and therefore you had to test your tests before you could proceed with your analysis. Reinsch's test was adopted because it was supposed to get over that difficulty; but now it is known that the chemist should have the same reason for suspecting that arsenic may be found in copper as well as in either sulphuric acid or zinc. This is an illustration to show that something more is required in attaining scientific facts than even the most careful and accurate power of observation. That, no doubt, is a great intellectual power, but at the same time I agree with one of Mr. Row's observations, that the men who devote themselves most assiduously to the mere observation of minute facts in nature are scarcely ever, from the habits they acquire, good general reasoners on general grounds. The eye can be readily adapted by training to the most minute observation, and may easily become more skilled and adapted to observe objects. The eye is a most wonderful instrument, from the power of adaptability which it possesses, and which enables the savages and Arabs to have long sight, while it gives to others who have to examine minute objects an almost microscopic vision. But that microscopic sight leads frequently to a microscopic structure of the mind. Most of the objections raised against Revelation come from those microscopic observers, and I think that matter was very wisely and forcibly brought before the world in what I think the most valuable of all Dr. Whewell's works, his *Bridgewater Treatise on Astronomy*, where he traced the difference between the sceptical mind of Laplace and the believing mind of Newton. Laplace's analytical powers were of the highest order; he was a trained manipulator of analytical formulæ. Laplace was a man whose mind was trained to the manipulation of mathematical formulæ and the interpretation of mathematical symbols. Whewell showed that that had contracted his mind, and prevented broad general views. His was the case of a mere inductive mind; but Newton's was a deductive mind. He was a man who put together what had been arrived at by the process of deduction, and strove to bind it up into a general truth; and Whewell showed that there was this difference between the two, that where the one mind became highly sceptical, the other became highly capable of belief. The more we investigate the matter the more we shall find that faith is an element quite as much required by the mathematician or the physicist or the philosopher, as it is required by the theologian. I agree with Mr. Reddie in thinking that the illustration of the great antiquity of man

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was a faulty illustration, but I should like to carry it one step further. Let us suppose a hypothetical case. Supposing that human remains were to be found in the Silurian series ; that would be a scientific fact that they were found in a certain stratum, in a certain position, underlying certain other strata. But while that would remain a fact, the conclusion that therefore those remains must be millions of years old, or at all events more than 6,000 years old—that conclusion I think is only to be arrived at by a process of reasoning which may be most essentially fallacious. I think there was a fallacy in the illustrations which Mr. Garbett brought forward. Mr. Garbett, I am afraid, like many others of our friends, has a certain lingering belief that the theories of geologists, which I believe to be mere hypotheses not founded on real facts, may some day or other be proved to be true ; and this is an endeavour to hedge ourselves in such a manner that, supposing they are found to be true, we may still hold the Bible with them. But I say, first prove that these things are true, and then it will be time enough to see whether you require to accommodate your Bible to them. Suppose your Silurian men are found of a different creation : you have first to prove that they belong to a different creation, and then you have to prove their antiquity. It is very dangerous theology indeed, and cannot fail to be taken advantage of by the sceptic, when you say that the Bible is such an accommodating book altogether, that it does not matter whether these things are true or not for anything the Bible says to the contrary, and that there may have been hundreds of different races in existence. That is not my own view. It may be false, but I do not think that any man who reads his Bible honestly would say that it accords with the pre-Adamic hypothesis of the existence of former races. All sorts of efforts are made to make the Bible square with these hypotheses : this only arises from a great fear that science has proved that which it has not proved. I believe that the whole progress of geology is antagonistic to any such views ; and if not, we should wait until geology has spoken a little more clearly, and leave geologists to fight their own battles among themselves. Then I believe they will come back to the six-days' creation, and believe that all races of men were derived from Adam, and that there were no pre-Adamic races at all. (Hear, hear.)

The meeting was then adjourned.

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ANNUAL GENERAL MEETING, Monday, May 24, 1869.

The Rev. Walter Mitchell, V.P., in the Chair.

The Chairman.—I regret to have to announce the decease of one of the oldest members of our Council, who has always taken a warm interest in our affairs, and who has also been of especial value to us in all matters in which a clear, business-like head was required. The Council have just had the mournful duty imposed upon them of passing the following resolution :—

"That the Council have heard with deep regret of the decease of their friend and colleague, Mr. J. J. Lidgett. They desire to place on record their sense of the services rendered by him to the Victoria Institute, and of the continuous interest which he manifested in its objects and proceedings; and they hereby beg to offer their respectful condolence to his widow and family."

I am also requested to announce that the usual business relating to the affairs, accounts, &c., of the Institute, has been unavoidably delayed for a few weeks, until a Finance Committee which has been appointed are enabled to draw up their report. Unfortunately, our Hon. Treasurer has been detained on the Continent for some time longer than was expected, and that has caused some difficulty in making up the Balance Sheet; but I hope that, by the end of the Session, a very satisfactory balance sheet will be laid before another general meeting of the Society, to which the present meeting will be considered as adjourned. It is now my duty to call on the Rev. Dr. Robinson Thornton, one of our vice-presidents, to deliver the annual address for this year.

The Rev. Dr. Thornton then read the following :—

ANNUAL ADDRESS.

THE CREDULITY OF SCEPTICISM.

MAN *must believe something*. This is a truth which no one who has any acquaintance with the workings of human intellect or human affections can venture to gainsay. Man must assent to something beyond the limits of that world which comes beneath the observation of his own sense

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and perception. He cannot repress a desire and a readiness to acquiesce in some one or two propositions at least touching things extra-sensual, things high and beyond mortal ken. Just as in earlier years we sit by the seaside, and gaze on the fantastic forms that rise up from the horizon, till we seem almost to wander among the cloud-palaces of dreamland, and repose ourselves in the cool shade of some vapoury recess, that shows as though it were set in the midst of an ocean of rosy light,—so in our later thought-years our minds seem irresistibly to float away from earth, and rest in some shadow, at least, of the Infinite. Yes, man must believe something; and with many it is a far greater effort to disbelieve than to believe, a task of far more difficulty to withhold than to yield assent. Some will say that this arises simply from that mental indolence which accepts recklessly rather than undergo the labour of examination. Others may argue that what was formerly said of Nature is really true of mind, that it abhors a vacuum, and had rather fill itself with the untrue than not be filled at all. However we may choose to account for the fact, it still remains the same; the would-be unbeliever cannot disbelieve: he cannot cut himself off from the whole region of the Unseen: he must assent to something.

Hence the Credulity of Scepticism.

Let us examine carefully what these two words mean. It is an evident truth, which is nevertheless well worth repeating, that four-fifths of our disagreements in science and philosophy, and nine-tenths of those in religion, arise from carelessness and want of precision in the use of words. Controversy shelters itself and grows gigantic behind the mists that rise from equivocal and undefined terms.

1st. What is Scepticism?

Etymologically it signifies "a habit of examining." In itself this habit would be the reverse of injurious; a sound and enlightened scepticism would appear to be the only means of solid advance in philosophy, and a defence of, rather than an offence to, Religion. We know that the scepticism of Hume did overthrow, in this country, the old Aristotelian dogmatism, and led to a philosophy based on sounder principles,—that of Reid. Such was perhaps the first meaning of the name as applied to and accepted by early philosophers, who dared to doubt and examine where doubt was reckoned a treason:

Nullius addicti jurare in verba magistri.

But there arose sceptics in philosophy subsequently specially known by that name, who carried their doubting and examination farther than this salutary process of testing again the

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philosophic coins which had been so long passing current with so little claim to be regarded as true metal. Among the crowd who followed in the train of Alexander the Great into the unknown regions of the Five Rivers, beyond the Indus, there was a dreamy, thoughtful man, with quiet simple tastes, who, while others gave way to excitement or terror, calmly pondered on the new phases of Life and Being which opened upon him. He conversed with Persian Magi and with Indian Gymnosophistæ; he heard them chant the precepts of Zerdusht, the ancient hymns of the Veda; he heard them tell of Ormuzd the all-loving, of Indra the all-encompassing; and as he compared their teaching with what he had heard from his instructors Bryson and Metrodorus, and read in the fascinating books of Democritus, the sad thought flashed across his mind, "Can we ever know? How can we dare, while we gaze on the ever-varying phenomena that pass before our view, to assume that there is any reality, any fixed substratum underlying them all; or, even granting that there is, how can we venture to suppose that we are able to bring to bear upon it a power of comprehension sufficient to enable us to judge of it? Is our mind competent to deal with the Unseen?" This was Pyrrho the Sceptic. His *Scepsis* was not the doubting and careful sifting of truths up to his time regarded as axiomatic, but the turning of the intellectual gaze inward upon the instrument of understanding itself, and pronouncing sentence against it; or, more strictly speaking, declining to pronounce sentence in its favour. "How do you judge of the Unseen?" he asked. "You say you have a Criterion within you, an instrument for determining the Beautiful and the True, for discriminating between the Good and the Bad, the Ethereal and the Worldly; how do you know that this Criterion is correct? How can you be sure that it may not mistake the False for the True, or fail to detect the reality of Being under the unreality of mere appearance? Still more, if in things finite your Criterion be so untrustworthy, how can you possibly venture to apply it to the Infinite?"

The question remained unanswered. It was not yet time for Immanuel Kant to appear.

The word Sceptic, however, is applied, at the present time, not to philosophy, but to religion. It is not used to signify one who examines the truth of what is presented to him for acceptance, nor yet one who argues that he has no faculty which can be relied on for the apprehension of higher Truth: it signifies one who rejects the probability, if not the possibility, of communication between God and man; and especially one who repudiates the divine origin and authority of a certain

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Book, or series of books, for which alone is made the claim that it is such a communication. There is no need to endeavour to fix the origin of this religious scepticism. From the very first appearance of the very first portion of this Book there must have been, and we know there were, sceptics, of the school of Jannes and Jambres. And as time went on, and yet more parts of the Book appeared, and were held as further utterances, in grander and clearer tones, of the voice of the All-wise, sceptics must have multiplied and did multiply. But we have not here to do with those of old, who having breathed the atmosphere without, thick with the mists of error and the night of human ignorance, could not bear the purer breezes that emanated from the Great Teacher's finished work. We are concerned with those who in our own time have fancied they have found reason for rejecting as untrue what others hold to be God's Revelation to mankind.

There is another word in the title to be defined. What is Credulity?

Etymologically, the diminutive termination of the word *credulus* would lead us to imagine that some slight insinuation of contempt was intended in every case where it was employed. And this appears to be the fact. The credulous is not one who believes only, but who believes where he might be expected to disbelieve; where the majority of thinking people do not believe; and where the belief is itself no proof of the fulness of his reasoning powers. And thus we get to the true notion of credulity. The credulous person, as contrasted with the rational believer, is one who yields assent upon grounds which are not adequate to produce rational belief. Belief is properly defined to be the assent to a proposition as proved by testimony. It is a species of *opinion*. Opinion being the assent to a probable proposition, as such, Belief is the opinion which assents to a probable proposition proved by that special kind of probable premiss which we call authority, or testimony. Now, as Bishop Butler clearly shows, it is almost always a man's duty to act upon opinion or belief. In fact, if we waited for knowledge founded upon demonstration before we acted, we should in most cases not be able to act at all. But (to use the bishop's own words) "probable evidence is distinguished from demonstrative in this, that it admits of degrees." To ignore these degrees, and fancy one probability as good as another, is to fall into the fault which, when committed in the matter of *evidence* or *testimony*, we call "credulity." This word then signifies the habit of assenting to propositions proved by weak or insufficient testimony; to propositions *à priori* improbable, of which the improbability is

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not diminished by well-attested *à posteriori* considerations; the habit of accepting the less probable in preference to or equally with the more probable, the inferior testimony as more cogent than or equally cogent with the superior. We must not call a person credulous who assents to testimony, *because he does so;* we cannot apply that reproachful term to him unless he assents to inferences in themselves improbable, or only slightly probable, and resting on weak and unsifted testimony. The Mahometan, for example, is credulous, not for accepting the Koran in the first instance, but for accepting it on the unsupported testimony of Mahomet, in spite of the intrinsic improbability of much that it contains.

But as I said at the outset, man must believe something. He must assent to something upon testimony; he must be either a rational believer, or credulous. He cannot—much as positivists may endeavour to force him—expunge from his mind all that belongs to the region of the Unseen, where authority and Revelation, the Law supported by the Testimony, take the place of axiom and maxim. Hitherto the Sceptical school has accused us of credulity. We propose to turn the tables and fling back the accusation against them. They believe something, as we believe something; but the object of their belief is more improbable than ours, and the testimony on which they believe it weaker than we produce in support of our own side.

Somewhat of this credulous incredulity may be seen even in the school of Philosophical Scepticism. "We have no power," said Pyrrho and Timon, "to judge of the True and the Beautiful. The Criterion fails." But whence came this power to determine our want of power? If we are able to decide upon the untrustworthiness of our Criterion, then we lay claim to a higher Criterion still, the Criterion of the Criterion. "We assert nothing," said they, "not even that we assert nothing." This however is itself an assertion, involving the exercise of a higher Judgment,—the Judgment of Judgment. Here the sceptic philosopher shows his credulity. Instead of holding that we have a faculty, limited perhaps, but still a faculty, of deciding on what is brought before our mental sight; instead of accepting the testimony borne to the existence of this faculty by his own daily consciousness, and others' daily course of action, he prefers to lay claim to the possession of a superior faculty, which can try, and convict of incompetence and falsehood, and condemn to perpetual rejection, the judging power. And of the existence of this superior faculty he brings forward no testimony whatever. He disbelieves against probability and the sense of mankind; and believes without

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probability and without authority or proof. Here is credulity even in philosophical scepticism. Indeed, as an acute writer has observed, "for an absolute sceptic to argue at all is a piece of folly, only second to the folly of those who argue with him. If there is no credence to be given to the working of our intellectual power, the former, for consistency's sake, might spare himself the trouble of using them against the belief of his neighbours; and the latter might, with equal propriety, avoid the useless task of arguing with one who professedly has no faith in argument. The sceptic, in fact, writes at once his own defence and his own reply." This Huet and Pascal saw, and had recourse to Religion to extricate them from the difficulties into which their philosophy led them. This other sceptics, less happy than they, saw also, and wandered in the clouds of mysticism, doubly and trebly credulous in their incredulity; Van Helmont, and Poiret, and Swedenborg, dreamed on, saying beautiful things sometimes in their sleep, but showing in the very beauty of these disjointed utterances how true it is that man must believe much, to disbelieve at all.

But we are not concerned so much with the philosophical as with the religious sceptic. This Institute does not propose to combat the errors of those who distrust themselves, but with the far more dangerous errors of those who trust themselves and distrust their God. The religious sceptic, we argue, is more credulous than the believer. The admission of the existence of a Supreme Being at all involves, of necessity, the admission of His benevolence. At least it would be the height of credulity to hold that a Being superior to us in knowledge and wisdom, and, in some sense at least, the author of our being, should be absolutely without a will as regards His creation, or entertain a feeling of malevolence. It was a refined credulity which said, "to make worlds is Jove's pastime," just as it was a gross credulity which invoked Mars as "nimis longo satiate ludo," or in the wilder words of an older poet, the dramatist of superhuman existence, spoke of Zeus as neglecting poor miserable men, and rejoicing in the suffering of his own friend and councillor. If, then, the Deity is benevolent, it is antecedently probable that He would exercise some kind of supervision over His creatures,—preserving the life of the living, fostering the growth of the growing, guiding the intellect of the reasoning. In short, we may expect from Him a course of Nature and a course of Revelation: a course of Nature, for the orderly maintenance of that being of which He Himself is the Great First Cause; a course of Revelation, to guide the rational creature to those higher

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truths which lie above his own perception, those truths which have respect to the relations of the created with the Creating Mind. This, I say, is an antecedent probability, as our own Bishop Butler shows. It is to be expected from a Benevolent Ruler, that He should benevolently make some communications concerning Himself; and the expectation is confirmed by the analogy of our own dealing, where the superior invariably conveys directions to the inferior, and the more so where the information is such as the inferior, unassisted, would be unable to procure. But the bolder sceptic denies this. A Revelation, he says, is improbable. In spite of analogies, he accepts it as a greater probability that the Supreme should not, than that He should, reveal anything to man concerning His nature and will, more than might be read in His works. Which is the more credulous, he who holds that the Benevolent will limit His benevolence, or that He will not do so? he who asserts or he who denies that the Supreme One guides the intellect He has made? he who holds or he who spurns the sentiment, "Deos didici securum agere ævum"?

But our sceptic, possibly, does not go so far as to deny the possibility or even the probability of a Revelation. But when we come to the question whether a Revelation has been made, and, if made, where it is, then "altum silentium." There is a book, or set of books, which is believed and has been believed by many to be this Revelation. It has been considered to be, and in fact professes to be, a history of the dealings of the Deity with mankind, so far as bears upon their final destiny, together with certain models or suggestions for devotion, axioms relative to things divine, precepts for action, and some hints as to the direction of the Divine scheme in years yet to come. It is not antecedently improbable, our sceptic admits, that such a communication should be made, and in fact it is very much what we should expect to have made. "This is what I have done, these are hints as to what I shall do; these are rules for communicating with Me, these are laws to regulate your conduct towards Me and one another." Still, reasonable and probable as all appears, it is rejected. This is not THE communication which the Creator made. Now, supposing the probability of a Revelation granted, let us see what is the logical position of the sceptic as contrasted with the believer. The latter argues:—These books are much what we might have expected a Revelation to be. They contain difficulties, and we might, *à priori*, suppose that the will and word of the Creator would not be always easily intelligible to the created. They are not the definite, dogmatic

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statements, cut and squared after human rules and laws of thought and speech, which would have proceeded from a human author; they are just in the form in which a superior intelligence might have been supposed likely to cast them, if He desired that human intellect should exert itself to learn about Him, and yield Him not a lazy, but a rational service. There is a very respectable and satisfactory chain of testimony which fixes these books to about the ages at which they are ordinarily stated to have been proposed to the world. The sanctity which has continually been attributed to them, must have prevented any serious alteration, omission, or interpolation, being made in them. And therefore I believe that they are indeed the Word of God.

There is no credulity here. The antecedent probability is responded to by an intrinsic suitableness, or at least an absence of unfitness, and confirmed by an adequate amount of testimony. Wrong or right, the believer has plenty of grounds for believing.

Now look at the case of the sceptic. He admits that it is not improbable that the Supreme Being should bestow upon man a Revelation, but declines to allow that this Revelation is to be found anywhere. He considers that a certain benefit is to be expected from the Benevolent Author of Nature, and then, when asked to recognize it, asserts that it is nowhere to be found. Surely it requires more credulity to hold that the Deity is likely to do a certain thing and has not done it, than to believe that He has.

But we press the matter further. The Bible, as we term it, has been accepted in its totality by a large number of educated and thinking men; indeed, we may say, for the last ten centuries and more, by the great majority of educated men in the world. It has also been singularly preserved. Enemies have endeavoured to destroy it, and enemies and well-meaning but injudicious friends alike to corrupt it; but it remains still. Other works have been preserved indeed, and from remote ages: but no enmity was excited against them; they contained no precepts distasteful to mankind, no accounts of the quailing of human might before weakness, when strengthened by the Most High. The Rig-Veda had no adversaries. The Zend-Avesta provoked no wrath nor jealousy. The poems of Homer were the glory of the Hellenic race. There was every reason why these should be preserved, just as there was every reason why our Sacred writings, Jewish and Greek, should be destroyed. Here is a remarkable fact: the sceptic himself cannot deny it. These books have been largely regarded as sacred, and have been

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strangely preserved; how can we account for it? If we admit that they *are* sacred, the difficulty vanishes at once. They have been considered holy, because they are holy. The same Deity who caused them to be written, has caused them to be accepted, and has insured their preservation. There has been a special protection and a special barrier round them, like the shield of Pallas in the hand of Perseus, at once a light and a defence, a buckler to protect from harm, and a mirror to show the truth. There can be no credulity in acknowledging that these books are Divine, because they are not only such as we might look for, but also in the same condition in which we might expect them to be. The sceptic, however, prefers to hold that these books are not what they claim to be; that they are either pure inventions, or contain a grain of God-sent truth hidden under a bushel of humanly-devised fable. He prefers to believe that thinking men and unthinking men have joined together in accepting and retaining such false claimants of the honour of coming from above. He prefers to maintain that accident, not Providence, has preserved them; that men have been so inconsistent or so infatuated as to reverence without reason enactments which they did not like, and doctrines which reproved and abased, instead of flattering and exalting, the glory of man's intellect, the pride of humanity. In short, he declines to admit the more probable, and embraces the less probable. He refuses to attribute the phenomena he beholds, and the real facts which he cannot help admitting, respecting the books of the Bible, to a cause which will easily explain them; and does explain them in a manner at once inadequate and improbable.

But I have been speaking of the Bible generally, and as a whole. Nothing can be more certain, says the sceptic, than that it has no right to be considered or treated as a whole. It has no coherence. It consists of a number of books, fortuitously bound up together, because erroneously supposed to treat of the same subject, in the same manner, and upon the same principles. Even in the individual books themselves, traces may be recognized of one or two, or many, independent and incongruous sources, from which they are compiled. I regret that I cannot enter upon an answer to these propositions. It would give me sincere pleasure to endeavour to point out to you how the Jehovistic and Elohistic theory of Astruc was the theory, not of a sceptic, but of a good Christian, and how all good Christians are quite prepared to allow that Moses was directed by the Supreme Intelligence to make use of certain early records preserved in the

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Aramaic tongue, in some of which he retained the Aramaic Aloho, and in some substituted the great name which he had been taught (יהוה) Jehovah, the self-existent, for the mere (בעלא) Ba'al, the lord of existence, a name already desecrated by its use in what Dr. Williams would term "the fierce ritual of Syria." But I forbear. We are not a theological society, and such a discussion would be theological. I repeat the words which I uttered as your Chairman (I am glad to be able to say with applause) at the beginning of this session, that we are a scientific, not a theological society. I refrain, therefore, from a theologico-critical examination of this form of scepsis. But scientifically speaking, I may ask the sceptic, How do you account, philosophically, for the fact of the remarkable coincidences between these non-coherent books? On my principles, I can explain a seeming discrepancy. Indeed I think I can prove that no real discrepancy exists. But a coherence is a more difficult fact to deal with than a difference. If Nathan (or some one of that time, for I will not discuss authorship) tells us that David promised an inheritance to Chimham, and Jeremiah writes of the inheritance of Chimham, how can we explain the agreement, except on the hypothesis of truth? Can we believe that a forger, or a set of forgers, would be possessed of such superhuman acuteness as to concoct statements agreeing with one another in this minute manner, and of such astounding self-denial as not to draw attention to these agreements, as being proofs of the veracity of the concoctions? If there is credulity anywhere, it must be, not with one who believes that these statements agree because they are both true, but with one who maintains that so preternaturally clever a set of forgers could exist, and could exert themselves to maintain—what? not an easy-going, man-flattering system, but a system against which its enemies have ever alleged that it is too man-depressing, too God-exalting, too superhuman. Are the Scriptures not to be considered as a whole? Why, the separation of them actually weakens the sceptical argument. If they are a whole, they might (hypothetically) have proceeded from an intelligence lower than the highest; but if not a whole, there is a unity and a coherence in them, which can only be explained, without resort to the grossest credulity, on the view of their authors having been guided by one and the same Supreme Intelligence. "It is easier," says Bacon, "to accept the Talmud, the Koran, and the legends, than to allow that the universe exists without God": and so we may say, It is less credulous to believe that the so-called Scriptures are what they pretend to be, than to hold that they are other than the Revelation of the Most High.

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A few words more. On what grounds does the sceptic base his theory of the formation of the Scriptures? Ours is definite, clear, intelligible. Right or wrong, we have something to say for it. But what is the sceptical theory? Can the supposed originals be produced? Have they been preserved, to show where the compiler exceeded, where he fell short of, his limits? If Plutarch misrepresent Herodotus, if Andronicus misunderstand Aristotle, if Theophylact misapprehend St. Chrysostom, or if the Targums distort or add to the Scripture, we can at once compare the later with the earlier, and show the error: but where are the originals of the Scriptures? Have they perished? On our view, they have been allowed to disappear, the Divine sanction being bestowed on those parts only which are incorporated in what we hold to be the Divine narrative; but on the sceptical ground, we may fairly ask, where are they? If they have had the same chance in the struggle for existence (one involuntarily uses Darwinian phrases) as the alleged Scriptures, how is it that they are not forthcoming; that all of them have given way to a set of compilations based upon them, and misrepresenting them? It is surely more credulous to believe in the existence of originals now not forthcoming, than to maintain that the books we have are Divinely-protected originals.

There is, however, another form which the objections of the sceptic take. He professes to compare the conclusions of science with the propositions and statements of Scripture, and to find them so entirely at variance, that no one whose mind is logically constituted, can accept the latter, but must surrender them to the former. The Biblical cosmogony, he urges, is opposed to facts. The Biblical ethnology is inconsistent with what we see to be the present condition of the world. Geology teaches us what we cannot reconcile with the Scriptural records. The Hebrew tradition is opposed to what we find by experience to be true. The sceptic, then, believes something. As I said at the beginning, his mind is not a vacuum, even on such high matter as the Being of God, the universe, and man. He believes the testimony of science. He acquiesces in the propositions of geologists, ethnologists, and his own experience, but rejects what others receive as coming from God. But whence came these propositions which he is willing to accept? Does he not receive the most startling statements from his supposed science? He accepts a cosmogony, as difficult as and more incredible than that of the Bible. On what testimony? He accepts a popular or a scientific ethnology; but on what grounds? He appeals to his own and others' experience; but why is he at liberty to assume that this experience is true? May he not err as well

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as others? He invokes the aid of geological science; is there anything fixed as yet in that branch of philosophy? Is it not true that for years those who were sceptics on geological grounds opposed to the Biblical cosmogony a scientific system, three-fourths of which at least has been repudiated? They assented to propositions proved by imperfect testimony, resting on insufficient experience, arrived at by incomplete induction. The probability of these propositions was nothing near so high as that of the correctness of the Bible account. Both cosmogonies, we will grant (for argument's sake) were equally probable, or equally improbable *à priori;* but either the one or the other had to be adopted; and the sceptical school did adopt the one which had the smallest amount of testimony and probable argument in its favour. This is credulity. But now that geologists are relinquishing their old position, and taking up a new one, the sceptical school will still believe; for, as I have said, men must believe something; they will believe still what comes to them on the testimony of science already proved fallible, and reject still what comes to them with the witness, the "prestige," if you choose to use the word, of ages, and without any more intrinsic improbability—indeed, with less—than their new scheme. I am not endeavouring now to prove that geology is worthless: I am far from thinking, and much farther from wishing to make out, that all the careful, patient investigations of its votaries, all the magnificent analysis which has been brought to bear upon the facts brought out by those investigations, are utterly useless. A humble student and admirer of physical science, I should be one of the last to utter such an absurdity. I know that sceptics have this accusation always in their mouths ready to utter against the believer. But we do not reject science as they reject revelation. We do not carry that scepticism into science which they do into religion. Nature is true, and grace is true; the truth of God is in all that He, the Truth, has made. No science is worthless—nay, rather, all are precious; but sceptics are credulous, more credulous than believers, because they accept the less probable, on weaker testimony, and reject the more probable, which has a stronger testimony in its favour. They would rather acquiesce in the amazing miracle of nine-tenths of the thinking world for ten centuries being deceived by a transparent forgery than allow, what is by no means miraculous, that they and theirs may be in error. And as with science, so it is with other things. The sceptic will believe in the authenticity of an Egyptian hieroglyph, and in the correctness of the translation of it with which he is furnished; he will believe the Ægyptologist and the Egyptian

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chronicler, but he will not accept the Bible. Does he find here and there in other works quotations from Sanchoniathon, Berosus, and Maretho, he will put his trust in them, and also in those who quoted them ; but he will not give the same trust to the Bible, and those who quote it,—nay, he actually shuts his eyes to the testimony borne to the truth of the Scripture narrative by the Assyrian inscriptions as interpreted. Or if a writer of his own days composes a Hebraistic romance, and substitutes it for the simple narratives of the Messiah's ministry, he will accept it ; he will give a credence to Strauss and Rénan which he refuses to John and Paul, to Clement and Justin. Ever credulous where man is concerned, and man alone, he declines to believe where the work of the Deity is made to appear.

It would be impossible for me even to attempt to go into the minutiæ of sceptical criticism of the Bible and the Christian faith, and to show that in nearly every case the sceptic attaches credence to something, which something is at least not more credible, and very often actually less credible, than the Sacred records. Such a work would fill volumes. I cannot, however, forbear directing your attention to one matter of detail. I must bear humble witness to the masterly manner in which a well-known writer has shown this credulity of the incredulous to be displayed in their treatment of the Book of Daniel. This book (Dr. Pusey's *Daniel*) has already become a standard work amongst us. It has not been answered, for it is unanswerable. The book of Daniel is confessedly, if the expression can be allowed, the least probable book in the Bible. Its being written in two different dialects, its definite historical narrative, and its equally definite prophecy, the miracles it records, and the foreign expressions which it of necessity contains, make it the mark at which the first arrows of doubt would naturally be levelled. If Daniel be proved genuine and authentic, the same proof as regards the rest of the Scripture will be easy ; there is no other so assailable. And assailed it accordingly is. It is a romance, it is a forgery ; it is a history, and an incorrect one, pretending to be prophecy. It is a late production, later than the times of the Maccabees. Its language is late, its theology Rabbinical. The learned writer examines each one of these points carefully and dispassionately, and clearly shows that to hold any one of them, far more to hold them all, involves a greater amount of readiness to assent to mere probabilities and hypotheses than the rational believer ever requires or indeed possesses. He shows that it cannot be later than the period to which it is referred, and is exactly what it would have been if

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written at that period; that its theology is that of the earlier Scriptures; that the supposed late language is not really such, and that this whole objection arises out of misapprehension, if not ignorance; that the book contains, put it where you will in point of date, undeniable prophecy; that the supposed historical inaccuracies are really indications of extreme accuracy; and that many touches are found in it, involving a knowledge of national customs and the like, which could have been possessed by none but a contemporary. To dispute all this requires more credulity than to believe.

Sceptics are of two schools. There are those who examine in order to pull down, and will believe anything, so they can, by believing it, and inducing others to believe, undermine the general faith in the scheme and the records of Christianity. But there are those whose *scepsis* is really intended to lead to truth; and though it may, according to our notions, fail to attain that end, we cannot help respecting those whose object is really the same as our own. To them we would say, "See how much you must believe in order not to believe as we do! See what violence you must do to your own minds in order to expel from thence, or guide at your own will therein, those thoughts of the Infinite which we maintain are directed by a celestial rule and a superhuman Guide!" You must have such thoughts: if there is a Deity at all, you must think of Him. "When the Scripture," says Lord Bacon, "tells us, *The fool hath said in his heart, there is no God,* it does not say, *he hath thought it in his heart;* nemo enim Deos non esse credit, nisi cui Deos non esse expedit." Take care, then, that you do not run to the extreme of credulity, by believing in a God of your own construction without any testimony to His existence, save your own imaginings. Such a belief may lead to outward expressions, and inward feelings too, which may be mistaken for the comforts of the Christian. Spinoza was termed "a God-intoxicated man," but the god which inebriated him was but the elaboration of his own mind and heart—not a benevolent Being, the object of his adoration, and the source of his hopes for the present and for the future. To such a Divine Person we must turn, the Author of Nature and the Giver of Revelation, Who alone can satisfy the longings of the soaring intellect, or fill the void in the mourning heart. To believe in Him and His is the truest reason—to disbelieve involves the merest credulity or the blindest self-reliance. And so those will find who seek in order to learn. There was one who wandered of old, and was guided, through many a maze of error and blind acquiescence in human theories, to the Truth. Augustin the rhetorician, Augustin the self-indulgent, Augustin

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the Manichee, became at last Augustin the Christian Father, and he leaves us the sum of his varied experience in that one short, pregnant Confession to his Heavenly Father, "Inquietum est cor nostrum, donec requiescat in Te"—"Our heart is restless till it rest in Thee."

Charles Brooke, Esq., F.R.S., V.P.—After the able and eloquent Paper we have just heard, I am sure I shall have the hearty concurrence of all present in moving "that the thanks of the meeting are hereby presented to the Rev. Dr. Thornton for his valuable address, and that it be printed in the *Journal of our Transactions*, and also published separately."

Admiral Halsted.—I beg to second that motion. I am quite sure that all who have heard Dr. Thornton's address will feel with me that this Society, in sending forth such papers to the civilized Christian world, is doing a work which will redound to its honour and credit; and at the same time that there will be few of those papers which will excite more universal interest and be more acceptable and better regarded than the one we have just heard read. I only wish our Institute was better known and more widely appreciated than it is; and I wish also that more members of my own profession belonged to it; for there are times and seasons, in the intervals between the exciting work of our immediate duties, which would be well occupied by a consideration of the serious subjects, on which this Institute not only puts forth papers and discussions, but on which it clears the way for the discovery of truth, and combats those who are so anxious to cloud God's word with scepticism of every sort and description. There is no Institute which has yet been founded which has so deeply, so clearly, so distinctly, and yet with the utmost moderation and with the utmost amount of Christian forbearance, done its work towards clearing away those clouds, and giving men's minds the fullest and clearest information upon the subjects it is intended to illustrate, and for the purpose of meeting and removing false views and false science.

The Chairman.—I think I need scarcely call upon you to pass this motion by acclamation. The paper of our learned and excellent vice-president has indeed shown that there is a unity in our proceedings. It is a very valuable paper, coming in on our third anniversary, because it gives admirable ideas of the kind of work we are endeavouring to do. The greater part of our papers will be found to bear out most fully the thesis of Dr. Thornton—namely, that those who oppose the Holy Scriptures show the greatest amount of credulity, while those who maintain the unity and truth of Revelation are those who have the greatest amount of reason and of reasoning on their side. We have been banded together, some have said, only to maintain a foregone conclusion; but, in fact, we have come together to defend the Bible, believing that Bible to be true, and we have no wish to deny this. But, while we have our own feelings with regard to the antiquity and authenticity of that book upon other grounds than mere external evidence, for we most of us believe in that book not only upon external evidence; not only from philosophy; but from the teaching of the Spirit within our hearts, and

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from something bearing witness to us that there is something in that book which alone will fill the void that man feels, and which alone will soothe man's sorrows and point out to him the means by which his sins and sorrows may be healed. I believe there is no greater philosophical truth, or one which can be maintained by such a tremendous amount of testimony, as the existence of sin in the world and the stain which sin produces in man's innermost being. The fallen man, who feels that he is a fallen creature, and who feels that the Bible is the only book which gives him a true account of that fall, feels also that it is the only book which gives him a remedy or anything which will supply all the wants of his soul, and it supplies this with a fulness which may be appreciated and felt by the highest philosopher, by the most profound and truest student of all that is revealed in the external works of God ; while yet at the same time it is comprehensible by a child, and it enables the Christian child to meet death without fear or apprehension. It carries comfort and consolation into the peasant's cottage as well as into the palace, and it appeals to the peasant man and to the peasant woman with the highest and noblest philosophy which the world has ever seen. We know something of the philosophy which was acquired by patient seekers after truth—by men who sought for it without the full aid of divine inspiration—but, let me ask, can we find anything anywhere in the pages of Plato, or in the pages of Cicero, which is at all comparable with the majesty of that philosophy which we may have here in a peasant's cottage from a man who has had nothing more than the teaching of that marvellous book, the Bible? When we see such power as this, we may well claim it for ourselves that we are not credulous in believing in the divine nature of the book which has not only civilized Europe but which is carrying its civilizing influence throughout all the nations of the world, and which gives the lie to all that pseudo science which says that men are of many races and have not come from one common source and centre. That book shows us that the soul of man is the same whether his skin be white or black. The comfort and consolation and philosophy of that book are adapted to the wants of the whole human race, wherever they are found or however deeply they are sunk in barbarism. And this is not all : when we meet a sceptic face to face and analyze his science, we are always led to this conclusion, that the receiver of revelation is not credulous. He is a man who acts on the soundest and strongest probabilities, and who would go even further than Dr. Thornton and say, that in none of the mixed sciences received by man as demonstrative, can you find such an amount of demonstrative proof as you have, if you will only patiently and earnestly enter into it, to prove that the book which we believe to be divine really is divine. In adducing all this we are not credulous, but we are acting the part of men who can use scepticism in its right sense—in the sense in which thinking men may rightly use it to determine whether that to which he gives his assent be true or false. But there is another remarkable thing which fully bears out Dr. Thornton's thesis, and it is this : Only watch the scientific sceptics, and see how very credulous they are upon those subjects which seem to be most monstrous to

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the apprehensions of common-sense men. Not only do their various theories require a greater amount of credulity for their acceptance, but I think it may be accepted as an axiom, that all those men who have furthest advanced their scepticism have shown the necessity of believing something by professing their belief in absurdities utterly contrary to common sense; thus manifesting credulity of the highest character that it is possible for us to conceive.

The vote of thanks to Dr. Thornton was carried with acclamation; and the Meeting then adjourned for business purposes to a future day to be hereafter announced.

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ORDINARY MEETING, June 7, 1869.

The Rev. Walter Mitchell, M.A., Vice-President, in the Chair.

The Minutes of the last Meeting were read and confirmed, and the Hon. Sec. announced the Election, as a Second Class Associate, of

The Rev. Henry Walsh, M.A., Bishopstrow, near Warminster.

The Rev. Dr. Irons then read the following paper, in continuation of Parts I. and II. in the *Journal of Transactions*, pp. 1 and 86, *et seq. ante*:—

ANALYSIS OF HUMAN RESPONSIBILITY. *By the* Rev. William J. Irons, *D.D., Prebendary of St. Paul's, Vicar of Brompton, Middlesex.; Mem. V.I.*

(*Third and concluding Part.*)

CONSPECTUS.

XV. Why we pause in our argument :—
How M. Comte's Philosophy stands in our way.
—Divisions of opinion among Positivists ;
M. Comte's Divisions illogical—and unreal.—
(How we have no concern with mere speculations.)
At what point M. Comte comes across our argument.
His dealing with *abstractions as agents.*
His having no philosophy of *Beginnings of Motion.*
His evident *collision with facts* of our being.
English Positivists more logical.
Our appeal, with them, lies also to facts.
They have no philosophy as to ethical *Defects.*
(A brief Digression ; as to The True-always ; and its Metaphysics.)
Determination of the case against M. Comte.
(§ 103–115.)

XVI. *Defects* in the present Probation of man.
What they imply.—No antecedent objection to the
(1) idea of *Assistance* to moral agency ;
(as to knowledge, and to power :)
No antagonism of the moral and spiritual admissible in Deontology.
(2) Revelation specifically *interferes* with the Moral system ;
(which might be incomplete without it.)

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(3) Morality *de facto* implies more than it explains :
and raises more questions than it solves :
We ask to *know more.*

(§ 116-119.)

XVII. Imperfect Probations nevertheless are Real Probations.
(1) Responsibility and knowledge *co-exist*, always.
Responsibility is enlarged by new knowledge.
(Variety in the processes of gaining knowledge.)
(2) No real modes of attaining knowledge can be thought to be *à priori* inadmissible.
Revelation is subsequent to Responsibility ;
cannot interfere with Responsible Freedom ;
nor with prior truth.
(3) Our right and duty in judging alleged Revelation.

(§ 120-125.)

XVIII. *Differences* of knowledge *both before and after* Revelation.
Speculation as to the limits of knowledge, useless in practice
and sometimes dangerous ; as involving denial of *insight*
(which is termed Faith).
(1) The Primary fact of our Relation to the Supreme, as Judge,
showing the *idea of Retribution* in our consciousness.
(2) The *fact of Repentance* for wrong—in relation with this.
Connexion of Repentance with the Phenomenal ;
and of Retribution with the True-always :
and also of *Mercy :*
(Details lie beyond our argument.)
(3) A *future life* desired by beings related to the true-always.

(§ 126-134.)

XIX. *False Teaching*, never in relation to the true-always :
but only adapting the phenomenal.
(1) *à Priori* Theology, not primary in our argument.
Modes of the Divine Consciousness, or Knowledge,—
both lie beyond us.
Contradictions as to knowledge, involved in the common idea
of Predestination :
(intellectual : and moral.)
Fallacy of Stoics and Predestinarians.
(2) *à Posteriori* solutions of Difficulties as to knowledge
must be subject to our Deontology.
Fallacy of "Authoritative Faith,"
and Authoritative Obedience.
(3) Union of Authority and Conviction.

(§ 135-141.)

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XX. Idea of Revelation now assumed :—*Assistance ;* and *communicated* by the Supreme Governor.

Limits of our Judgment here, deontological :

(yet our powers to know and to judge may be elevated.)

(1) The tone of Revelation naturally *positive :*

This does not demand *mere acquiescence.*

Obedience must be moral.

(2) Revelation cannot continue merely external.

(Case of Judaism :—and of Christianity, its literature and Polity.)

(3) Objective and Subjective Character of Christianity, distinct.

(§ 142–152.)

XXI. Internal Reception of Revelation.

(1) Gratuitous aid to the Responsible agent :="Grace" :

(akin, in some respects, to "influence :")

May be through human media, Divinely directed ;

and connected with human polity.

(2) Responsibility here implied :

(What failure in Responsibility may be.)

Inference as to Religious Responsibility :

Its gradations : (implying a primary element of FAITH.)

(3) Parallel of Moral, and other knowledge.

(§ 153–162.)

XXII. Reasoning not Disparaged by Faith.

No antagonism between them.

(1) We *choose*,—both Virtue and Religion.

(2) The ascertainment of Religious Truth is necessary and part of our Strict Deontology.

(3) Certainty of Faith. (§ 163–167.)

CONCLUSION.

XXIII. POSTSCRIPT. (*Ad Fideles.*)

(§ 168–173.)

NOTE.—*It will be observed throughout the present Analysis, that the least possible reference is made to the names of philosophical schools and writers. The mere mention of half a dozen well-known metaphysicians would rouse a partisanship of so strong a kind as to disqualify many, for a time, from considering the subject itself in the simple form here presented. For the same reason, hard terms, and words which do not explain themselves either by their etymology, or their common use, are avoided. They would lead, too, to the conviction that none could discuss these subjects who had not been through the bewildering round of writers who have attempted metaphysics ; some of whom are unintelligible to others without a glossary. A subject of such universal importance as that which is here before us, ought to be expressed in language which they who are interested in it may understand, whether they have mastered or not all the philosophies outlined in Tenneman or Brucker. In saying this, it is not meant, of course, that no metaphysics are essential to ethics ; but that, being essential, they are capable of being disincumbered of many technicalities which, though they look knowing to the uninitiated, have to the common-sense world much of the deterring effect of jargon. At all events, in the present pages, every effort will be made to avoid that atmosphere in which all plain meaning escapes in the cloud of words.*

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XV.

103. If we were simply to follow the course of the present argument, and advance to the logical consequences of premisses which we may fairly regard as indisputable, there would seem no need to pause in this place on objections really disposed of by previous considerations. But a moral argument needs something more than brief exactness, if conviction is to be hoped for. There are other obstacles to its success besides those of the reason; and the previous inaptitude of some to receive moral conclusions, and the practical reluctance of many, must not be forgotten. We have to remind all who hesitate, that ours is no mere speculation. The position is, that to reject our Deontology is to reject facts; and it is this that we must press.

Why we pause in our argument.

104. Among those who, in our days, deliberately and somewhat loftily deny what we mean by Religion, none perhaps have been more influential for a time than M. Comte; and in noticing his positions we touch the similar objections of others. It is true indeed that certain peculiar views of Comte are fading: and this is not the place of course to examine his philosophy as a whole. In many respects, it already seems on the wane, among Secularists of the higher order. Thus his *Classification of Sciences* is found to be less logical than Kant's, less philosophical than Aristotle's, and inferior to Lord Bacon's, in the *Instauratio Magna*,—which apparently suggested its outline. Even some of the most distinctive results of Comte's teaching are being rejected, and indeed were evidently fanciful from the first. Yet it is unquestionable that, allowing for all diversities, English Positivists, (for so they must be distinguished, for lack of other special name,) still have much in common with the founder of the School.—It is not for us however to complain, if theorists whom we know to be in error disagree among themselves in working out their hypotheses. Thus, Mr. Buckle quite repudiated the moral notion of "reverence"; Mr. Lewes recoils from Comte's "Religion of Humanity"; Mr. Congreve remains its faithful admirer; while Mr. Spenser (destined to a permanent triumph over a host of philosophical inferiors who now surround his cause,) lays bare with logical unmercifulness the pretensions of the whole tribe of anti-metaphysicians, led on by Comte.

How M. Comte's Philosophy may stand in our way.

Divisions of opinion among Positivists.

105. But we must keep to our own point. Positivists of every class—all men indeed who would deal with the facts of our

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nature,—are bound to face this, that among the ideas of Right and Wrong in our world, a Religion of the Supernatural has always had place. Comte attempts to regard Humanity as passing at different periods through three distinct stages of progress, first the theological, then the metaphysical, and at last the practical; but the fact is, that the earliest conditions of our race contradict this subdivision; and the Comteist cannot point to any theology which had no metaphysics, nor to any metaphysics which could avoid theology; nor to any practical system which had not presupposed both. It would require no ingenuity to make out a case which should entirely reverse M. Comte's *ordo sæclorum*, and show that the antediluvian world's progress, from Tubal-Cain to the building of the ark, was "practical;" that men took a more "theological" course from Abraham's time; and became "metaphysical" and sceptical from Plato to Marcus Antoninus. But such speculations would be almost as dreamy as Comte's. The facts assure us that theology, metaphysics and practice belong to human nature always. Every aspiration beyond the present, every general term in common speech, every action in common life, in every age, condemn M. Comte's illogical division.

Illogical Divisions of M. Comte; speculative not real.

106. Without, then, pursuing any profitless controversies, we deal with M. Comte simply as he stands in the path, with a Religion of the Supernatural before us. We obtain conclusions by a simple induction of the facts of our human world. Whether, then, M. Comte's belief, *e. g.*, that we have arrived at a distinctly new stage in our career, all our history being a chain of events—(a belief which was no novelty even in the days of Thucydides)—be admissible or not; whether again his idea that human knowledge may be regarded as one vast whole—(an idea which has haunted even the cloister, from Albert the Great till now)—be practically important; or whether other special doctrines of the French philosopher, be worthy of debate; our present concern is to ask, whether his theories obstruct our way?

How we have no concern here with mere speculations.

107. M. Comte we find would exclude from his cyclopedia the thought of God, as the Personal Ruler of the Moral world, (which we have shown to be inevitable,)—as much as he would refuse Him as Creator. Monotheism,—whether Hebrew, Mahometan, or Christian—he, in distinct terms, repudiates. Even a Great Cause, a Fount of Order and of law, he conceives to be impossible, since according to him, Order and Will are incompatible terms. Yet, while, in contradiction of the world's facts, he thus dis-

At what point M. Comte comes across our argument.

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penses with Theology, and with Christianity also as a passing phase in human affairs, M. Comte with equal unreason, would introduce, as if distinct agents, "Order," "Force," "Dependence," and so on;—terms intelligible enough, of course, as expressing human conceptions, but wholly unproved as distinct entities; indeed so unintelligible, as such, that they absolutely vanish, when we attempt to translate them into the language of common sense.

108. We would bring M. Comte's, or any ambitious philosophy to the test by this; let it construe its abstractions into realities; for abstractions are not agents, (whatever be our convenient way of speaking,) until this can be done. (§ 21.) Comteism cannot bear this test. Here it shrinks from facts. It aims to supply the *raison d'être* of whatever is, and then denies Causation; and takes refuge in "Order," just as a more manageable abstraction; —Causation implying a special kind of antecedence, which Order does not.

Beginnings of motion unaccounted for in M. Comte's philosophy.

But this will not bear looking into. M. Comte has not even his abstractions ready, to account for the *beginnings of motion*, either in the physical world or in the intellectual. Yet it is a fact co-extensive with human nature everywhere, that a beginning of any motion suggests to all men a prior agent. "The wind bloweth where it listeth," is a felt statement, for example, of a beginning of motion, unaccountable to man, but of which there *must be* some account. Indeed he cannot otherwise explain how every investigation of science invariably takes the direction of causation: it could not proceed a moment in the contrary way. How then can inquiry into any action be intelligible, except on this same latent assumption of causation? Say you, it is "Order" that is enquired for? But why? Why call any condition Disorder? If facts oblige you, then you own Causation.—Comteism, again then, appears to be a simple denial of facts.

Comteism in collision with facts of our being.

109. Yet in denying Causation, M. Comte is more far-seeing (in so far as his system is concerned) than some of the more logical reasoners who have opposed his views among non-Christians: for it is impossible to admit Causation as they do, without ultimately going on to Religion. Hence it is, that we may be calm as to the future of much of English Positivism. It is too moral to deny Causation; and too closely observant of facts to content itself with M. Comte's analysis. In logical consistency it must advance towards the point where it must meet the challenge of Christianity; and we are quite content to say, let the truth have its

English Positivism more logical.

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course. So far as Positivism is founded on all the facts, the Christian admits it, and claims it to be on his side.

110. We have a right to cling, then, with pertinacity to that which our argument has clearly arrived at: Human Accountability, imbedded in all the facts of mutual Praise and Blame: Human accountability constituted of action, in relation to antecedent right: Human accountability inseparable from some Freedom: Human accountability, inextricable from difficulty and injustice until we own a superintending Moral Ruler: Human accountability, co-extensive with all human power, and thought and action. (§§ 15-51.)

111. Such being our present position, nothing irrelevant, nothing that is subsequent, can supersede it. Much indeed may follow. The Religions of the World contain facts needing analysis as connected with the moral life of man. Even *opinions* in Religion, right or wrong, have real influence on moral agency.—No doubt there may be, and too often is in all human Society, a wide divergence between theory and fact, opinion and practice. This is always possible, because we are free: No part of Ethics can ultimately be mechanical. But even opinions have their significance: And a moral convulsion is no doubt imminent, whenever the divergence grows extreme and has been long-continued, between what men profess, and what they really do. To pretend to one set of principles and act on another cannot last, and ought not. This phenomenon is one of the most startling evidences of defect in popular Deontology. (And whether the actual conduct and pursuits of Christians even approximately realize the theory of Christianity, is unquestionably a matter of grave consideration, though not for our present argument.) We here insist that Religions demand attention, as attempts more or less to supply a need; and that Comteism takes no account, and has no philosophy, of those defects in man's Probation which Religions of the Supernatural at least endeavour to supplement, by aiming at the true-always.

Our appeal, like theirs, to facts.

They have no Philosophy as to Ethical Defects.

112. It would be attractive to some, if we might here diverge into a more formal statement as to the "true-always," in opposition to the scepticism which in our time has so asserted the Relativity of all knowledge as to mean that neither of the correlatives is anything more than a negation of the other. (§ 29.)

A metaphysical digression to the true-always.

We may add but a few words. The positive character of the true-always recognized by every conscious being, could

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not perhaps have been disputed, had it not unhappily been represented by such uncouth negative terms as the "unconditioned," and the "unthinkable," &c. Mr. Herbert Spenser has conclusively pointed out, that "in the very assertion that all our knowledge properly so called is relative, there is involved the assertion that there exists a non-relative"; and again, "an ever-present sense of real existence is the very basis of our intelligence": and once more, "Besides that *Definite* consciousness of which Logic formulates the laws, there is also an indefinite consciousness which cannot be formulated. Besides complete thoughts, and thoughts which though incomplete admit of completion, there are thoughts which it is impossible to complete, and yet which are still real in the sense that they are normal affections of the intellect." (See § 29.)

113. These suggestions must here suffice: we must not diverge from our main task. It is enough that a relation to that true-always which is no negation, (for it is essential to conscious agency,) we have seen to be also essential to the Supreme Ruler; and only because His Character is in perfect relation to the true-always, are we able to trust and reverence Him.—Indirectly, too, we may thus perceive how the popular difficulty is exposed, which represents the Supreme as external to the Universe, and therefore unknown. We only think of the Supreme as external to the phenomenal, or finite; not to the true-always.

Here we may be justified for the present, in taking leave of the Comteist. If he be of the party which would construct a religion without a God, we point to the facts of human nature as irreconcileable with his view, and evincing that to be without God, is, as man feels, to be "without hope in the world." This is the superhuman, supernatural element in all Religions. If we are dealing with the class of Positivists who discard even Comte's "Religion of Humanity," as unproved if not irrational, we must again remind them, that the facts are all against their unintelligible notion of virtue without freedom, —Responsibility without Causation,—goodness without Will and without conscious relation with the true-always.

The determination of the case is against Comteists.

We may now pass, to complete, as we believe on the unassailable foundations of fact, our argument for individual Religious Responsibility.—It arises in connexion with our relations to the Supreme: we have previously shown that there are such relations: and we have further found that religion can have no *à priori* denial.

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XVI.

114. The Difficulties of human Responsibility, which oblige that Supreme moral government which is at the foundation of Religion, are connected with defects of Knowledge, and of Power, in the individual. (§ 11.) This will now direct our analysis.

One end, at all events, to be aimed at in our present state of being is, as we have seen (§ 95), the perfecting of the character of the individual moral agent: nor can we fail to mark the possible connexion of this, with Religious ideas. The facts of life assure us, without doubt, that each one of us may become in character either better or worse; *i. e.* we may either attain higher relation personally, with the true-always; or we may deteriorate. Our Finitude reminds us too (§ 79) that our present conscious relation to the Essential good is limited, though capable of growth: and the law of Habit (§ 89) confirms to us the same truth. Our present imperfection, then, suggests the possibility, if not probability, of Moral assistance in our Probation, both as to our defective knowledge and our imperfect power. As a fact, moral beings are capable of receiving and of giving moral assistance, even among themselves: and the idea of such assistance as even pertaining to all social Deontology, may reasonably be latent in any religious system which concerns responsible beings, like ourselves, under the government of the Perfect Moral Ruler of the world of moral agents.

Defects in present probation,— what they may imply.

115. This general idea of "Assistance to moral agency" is not all, however, that Religion may offer. As beings "capable of goodness" (§ 20-46), living for a brief time in this world while our characters are undergoing Probation (§ 91), it is not unreasonable to think that we have some specific moral relations with the Supreme Governor under whom we act (§ 75), and by whom we shall be ultimately dealt with (§ 50). Since knowledge and duty are connected, there seems no antecedent objection, but just the reverse, to our having knowledge imparted to us concerning such specific relations. And in fact the whole history of our race shows us, that the expectation of such communications from the Supreme to the finite, is consentaneous to our nature. *A priori* objection to Revelations concerning "HIM with WHOM we have to do," is surely obviated, at all events for a time, by this reflection. Any vital Religious dogma, we may readily grant, should be the expression of some Essential fact in connexion with Respon-

No Antecedent objection lies against specific assistance being given to moral agency.

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sibility, and a true Religious precept an integral part of Deontology: yet provided that they are truly such, we urge that there can be nothing to prejudice them, in their appearing as a kind of later discovery in the moral system.

No antagonism of the spiritual and moral is admissible in such assistances.

116. Indeed it might suffice for our argument, that there should be no antagonism between the Discoveries, or additional truths, of the "Revelation," and the true-always on which our moral agency depends. It is clear that a revelation which comes to the assistance of the moral system, implies at once that that system is, *de facto*, defective. But this we have already admitted; and found in the admission an argument for Supreme Moral Government, which is not without weight when the elevation of our Personal Probation is the object before us. We cannot, of course, on the pretence of such elevation, admit of any antagonism (such as some indeed have set up) between the alleged Spiritual and the known Moral. Religion apart from the conscience, or moral nature, is inconceivable; it would be an idea of goodness as opposed to the true-always, which is a contradiction.

117. But the notion of any Religious development for us in the moral system itself is sometimes opposed, as if interference by a Supreme Governor, or new dealing with the established order of the moral world, were in itself impossible; yet in admitting the absolute necessity of such a Governor have we not already conceded such interference? nor can it be objected that interference would affect the foundations of Deontology, since the Supreme is Himself in perfect relation with the true-always.—"Shall not the Judge of all the earth do right?" is a sufficient reflection for every one, except the Comteist who conceives Will and Order to be irreconcileable, and that to admit Causation at any point is to disturb the mechanism of the Universe. But we have to deal with those only who acknowledge the facts of our nature.

Revelation implies specific interference with the Moral System.

118. No doubt, the teachings of any particular Religious Revelation must be tested before they are adopted as assistance to Deontology. This is matter of detail and not *à priori* difficulty.

Possible incompleteness of the Moral System without Religion.

We would rather ask, indeed, whether Moral Responsibility itself would not in some cases be open to dispute, in the absence—supposing it were so—of all those alleviations and assistances which Religion professes to give?—Religion is so real a need, the natural efforts at Virtue are in themselves so imperfect, and even the ideas of common duty so much in want of information and help, if not of definition, that morality itself

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has always been in some degree religious: and the incompleteness of the Moral System without the Religious element has been felt by every philosopher, and by every lawgiver, and perhaps by every thoughtful individual.

119. In tracking the beginnings of our moral life we find at length that we come upon facts most important indeed for our Probation, but which withstand our analysis—we find instincts far clearer than conceptions, and convictions stronger than knowledge (§ 112). At times even the simplest moral action is felt to have more in it than we can solve. If Religion be able to furnish us with any solution, should it be ground of complaint? Is it not with awe, rather than scepticism, that we mark that dimness, almost sacred, which so emphatically contrasts our sensible with our moral knowledge?—though the latter is still less doubtful than the former. High and noble aims proposed within us, betoken that we are near at times to a fountain-head which philosophy has not explored,—the true-always, which Religion alone has the courage to approach. Who does not find that Morality raises more questions than it solves; and, in fact, that it welcomes a Revelation?—We ask for *more knowledge:* and if we refused it, our Personal Probation might be injured.

Morality *implies* more than it explains and raises more questions than it solves.

XVII.

120. Whoever thinks himself and his fellow-men to be accountable, or responsible, for their actions at all, assumes for both them and himself some previous knowledge of truth, practical and real if not very definite. Consequently, the general enquiries, "what is Truth?" and "who can tell us the Truth?" are not altogether antecedent to Duty. The fact of Responsibility and the knowledge of some truth are synchronous. If they were not so, men might evade accountability by declining instruction; and thwart the formation of character implied in all personal Probation.

Even in imperfect Probations, Responsibility and knowledge coexist always.

The importance of this point obliges us to dwell on it.

121. For, no doubt, an increase of knowledge, or the further discovery of truth, may enlarge, though it does not originate, Responsibility for rejecting, or withstanding knowledge.

Revelation, while regarded only as supplementing knowledge, must still, being part of our Deontology, be received morally. Thus we find that its intellectual reception would be parallel to the intel-

Responsibility is enlarged by new knowledge.

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lectual reception of Ethics, and admit of the same wide variety in individual cases. The impatient and unreal way in which men attempt to ask, at times, "what is Truth?" and "who can tell us the Truth?" seems to betray either a disposition to equivocate, or a misconception of the nature and dignity of man's personal accountability already.

122. We find however such enquiry for "Truth" to be sometimes supposed to be adequately met by the suggestion, that Revealed Truth must come to us on some "Authority"; so that the ascertainment of the authority is everything;—and then, the question arises, whether it should be a traditional, or a living Authority; or whether the Revelation should be documentary, or purely historical; or whether, finally, it should be a communication to each individual?—Such disputes, (to which we will refer again (§ 141), are little more than technical, but are morally misleading;—the *fact itself* of additional knowledge for the moral agent being the vital point at present; and not the means of its conveyance. Probably the mode in which Truth is conveyed to different conscious beings lies, in many respects, beyond scrutiny. Our sense of Responsibility, or the fact itself, cannot be determined by any archæological examination of the processes by which we gained our more defined notions of duty. Probation is always going on: we are responsible at *each* step.

The processes of attaining knowledge may be various: the *fact alone* is important.

123. There is no previous objection, as far as appears, to the communication of truth either by a social organization, or by a "written document," or by "special illumination," or other means, provided that *it be truth* that the individual finds himself to have really received; and that it has been received as a moral conviction. Theorists unfortunately there are who are much more anxious about the method of receiving, than about the Truth received; unhappily, too, the waywardness, and weariness of Responsibility seen in some men seems to account for their eagerness in debating the preliminaries, as if in them they might find excuses for failure in duty.—But as every excuse presupposes the need of excuse, so these wranglings betray the unquietness of conscience, suspecting itself to be accountable while aiming to stand in suspense about the fact. Some who struggle most for what they term "authority," and for "illumination," as against "reason," are forgetful that they are in danger of removing Religion from the whole domain of Deontology; for in proportion as the individual is restricted, his responsibility ceases.

No previous objections to any true modes of attaining knowledge in Religion.

124. Revelation, or the imparting of Knowledge of further

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truth, must be conceived as coming to us subsequently to the idea and fact of Duty; and subsequently to the idea and thought of the Supreme Governor, or GOD. It finds us responsible; and treats us as responsible, *throughout*. The "authority" it may assert is such as is compatible with moral agency in us: the "illumination" it may give must be the illumination of a moral agent. It must be to us a voice from our Moral Governor, Who is true-always; it must be the influence of our Moral Governor, exerted for us, or upon us, or in us.

Revelation subsequent to Responsibility.

We must insist at every point, for it is obstinately forgotten,—that whatever Revelation may undertake for us, it cannot abrogate freedom while it retains responsibility: it cannot place moral beings in a position out of harmony with goodness: it cannot make us parts of a mere religious mechanism.—It cannot persuade us in a moral matter of anything against our foundations: it cannot, *i.e.*, clash with what we are obliged to begin with,—viz. the relation of the Supreme Ruler, and of all conscious agents, with the true-always.

And cannot alter Responsible Freedom and prior truth.

125. Many have in various ways disputed the individual right to say thus beforehand, what Revelation can, or cannot, teach. But this is disputing Probation. Such pre-judgment has been called "dictating to GOD,"—"sitting in judgment on GOD,"—"private judgment,"—and similar ill-sounding names.—But let us be reasonable. How can we even prefer one Religious kind of knowledge to another, unless we may *think?* How think without forming a "private judgment"? How form a judgment without "sitting in judgment"?—How love what is revealed, unless we feel it to be in harmony with the true-always?—Surely we are bound to choose the right, and we shall have no satisfaction if we avoid the obligation. All that we previously know to be true, must be remembered, and adhered to, in making later decisions.

Our right and duty in so judging alleged Revelation.

XVIII.

126. We have already seen that there is from the first a wide *difference* in knowledge among the conscious agents, who nevertheless, are responsible, and on Probation. If this be the case prior to Revelation, it may be so afterwards, for beings who, both before and after, are under the same Supreme Governor.

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What amount of knowledge might pertain to man by his natural constitution, apart from extraneous or supernatural assistance, is a speculative point into which we need not therefore enquire; especially as it would in every case be liable to immediate modification, in consequence of the individual being free. Nor could it be of the least practical use in our argument to attempt to assign limits for the *maximum* or *minimum* of present natural knowledge. Equally useless would be speculation on the "limits of religious thought," or of any other thought. We find them out quite soon enough, in the phenomenal, and have no means at all of defining them in the sphere of the true-always (§ 137).

Differences of knowledge, both before and after Revelation.

127. In saying, that some *intellectus* precedes purely experimental knowledge from the first in the conscious Agent, (or else he could make no beginning externally, § 24, 25, &c.) we have abstained from estimating it. We only say that we cannot conceive of experimental knowledge as gained by a being who was previously a blank. We know, too, that the finite conscious being does not conceive of himself as the highest being (§ 50), but, at the first dawn of his consciousness, compares himself with anterior and more permanent being, transcending his experience.

Speculation as to the limits of knowledge useless in practice.

And it should be added, that to define "limits of knowledge," *à priori*, would be subtly to deny beforehand to the Supreme Moral Ruler, the power to increase knowledge, or give that insight of truth, which in the language of Theology is called Faith. It might thus involve a denial of the reality of Religious faith, both as to the object and the subject; the phenomena beyond us, and the power to discern them.

And dangerous as a denial of that insight which is termed "Faith."

128. We must deal then with the facts as they arise: There can be no other rule for us. And the first fact that presses is that specific relation of each individual, in all his Probation, with the Supreme Governor, which we have spoken of, and concerning which none can doubt that more knowledge would be desirable.

From this we cannot turn aside, since it is He alone who makes our Responsibility just, by His final treatment of it; it is He alone who rules our Probation (§ 48). It was by looking at ourselves, we found our need of Him; and now by contemplating Him our thoughts are cast back on ourselves. (§ 97.) Our thoughts of Him must be such as shall be uncontradicted by what we already know.

The Primary fact of our Relation to the Supreme—His judging us.

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129. If He is to regulate the issues of Moral Agency according to justice, or the true-always, we are really acting in reference to that adjudication and not for the present moment alone. And let any one consider in himself, whether in our anticipations of final justice for the individual, in the great moral system of which he forms part, there are, or are not, the elements of the idea of future Retribution for wrong? and, though perhaps more faintly, future vindication of right? It is a fact of our nature, that wrong-doing such as stirs our own disapproval, *is* haunted by the belief of Retribution. Then, a Religion that gives knowledge concerning this, may supply a need. We may, at this point, await the message. To such a fact of our nature, however undefined, we cannot refuse recognition, even if it be confessed to be beyond analysis. If it be undeniable,—then a Revelation as to future Judgment, arising out of our relation to the true-always, to the phenomenal, and to the Supreme, has clearly nothing against it, but everything to make it probable, in the facts of the moral system, so far as we know them; nor are we yet in a position to dogmatize confidently even as to the nature or extent of that Retribution; they must be pure questions of Deontology. (See *The Bible and its Interpreters*, p. 94, &c., where the Duration of Retribution is morally treated.)

Showing the idea of Retribution in our Moral Consciousness.

130. Close to this sense of Retribution for wrong lies another fact. Certain kinds of wrong are accompanied, or quickly followed, by a Compunction which we are accustomed to call "Repentance." There are occasions when Repentance marks so great a change in the character of the Repentant that the work of his Probation has evidently advanced; the man himself has become a better man. Yet the limits within which repentance can justly expect forgiveness, and moral restitution, are but narrow, if we closely examine them. The social system of the world does not often identify repentance with acquittal. The political system scarcely recognizes it at all—perhaps from inability to examine it exactly. No philosophy can regard it as the undoing of wrong, even though it may be a guarantee at times against the repetition of wrong. Yet the individual is always too prone to set some value on his own repentance, even while he wavers in his estimate of it. On the one hand, he finds that however true his repentance, his sense of retribution is stronger, and hinders his relying on going unscathed; and that all the more, as he contemplates a Supreme Judge; yet, on the other hand, he feels that his repentance is a real plea, to which he morally clings. Repentance rids him not

The sense of Retribution as associated with the facts of Repentance.

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of the sense of retribution; but introduces a new fact of his moral nature, to be taken account of, doubtless, by the Supreme Judge.

131. Evidently some provisions which should adjust the sense of Retribution with the sense of Repentance for wrong, would be in harmony with the needs and facts of human nature. All Religions appear to aim at such adjustment; so that it could be no prejudice to any Revelation, that it found the true moral place for repentance, (without assigning to it by right an unreal intercessory position which is more than we can feel;) and that it calmed the fear of Retribution, without destroying its moral power. The efficacy of Repentance can only be estimated by us in the phenomenal: The superior power of Retribution lies in its relation to the true-always. A Religion which taught simply that pardon follows on repentance, would be as untrue to the *facts*, as would be a Religion of severity which ignored all repentance. The facts then point to a difficulty which may be solved in the *phenomenal now beyond us*, and which a true Revelation might justly be expected to meet. Mercy, too, is demanded in morals; yet it has no known law in nature. Crude systems of Expiation, and even monstrous theories of Atonement, availing themselves of this, have indeed, (as might have been expected,) abounded among false or corrupted forms of Revelation: but a fuller knowledge on the subject might nevertheless be justly here expected; a necessary Doctrine of Mercy, which may lie in the sphere of the true-always; or in relation with it.

Connexion of Repentance with the phenomenal, and of Retribution with the true-always.

132. All questions of detail, as to the nature of that interference with the moral system which the idea of future Retribution and of fitting Mercy implies, must depend on the ascertained Revelation; and our insight concerning it may be reserved to Faith. Not only, as we have intimated, are the duration and character of retribution questions purely deontological, but the *à priori* conception of moral reconciliation, and the conditions of the future life itself, seem out of the reach of our natural apprehension. Beyond the limits of present discernment, there must be the ultimate solution of problems really involved in the final and just adjudications of the Supreme, concerning Responsible Agents,—problems which belong to our moral nature so intimately, that there is no alternative, apparently, but to rely on having such solution, or else to regard our entire nature, and all its best observed facts, as enigmatical, or even false.

Details lie beyond our argument both of Mercy and Retribution.

133. For in addition to all these trying thoughts, there is

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felt to be a possible future which gives intensity to all anxiety. Indeed we cannot close our eyes to the fact, that human nature, with its dim hopes and fears, still desires to *be*. Extinction, as a rule, is shrunk from. That perfecting of the individual, which has been recognized as the end of probation, seems of itself to aim at a future. The law of continuity of being (not of phenomena) is keenly felt in our *individuality*; and no one can study human nature without finding this. The conditions of the life to come may be different as to the phenomena—(for even in this life they are perpetually shifting), but as to the true-always there can be no change. The future life must, together with the inheritance of the past, be a life amidst other phenomena; but our individual consciousness has been now, and will be hereafter, in essential relation with the true-always. A Philosophy of Duty which omitted to deal with the greatest fact of life—*its close*, and its desire *not to close* altogether, —must be self-convicted. A Revelation made to us now concerning that future life, could not but correspond to the innermost desire of conscious agency, still *to be*. It corresponds too with all that is implied in a summing up of the moral system of the phenomenal world, by the Supreme Moral Governor.

The law of Continuity felt in our individuality — not phenomenal.

134. Thus the "Life of the world to come" seems to be demanded as the inevitable result of a purely reasonable examination of the facts of the moral life of the present. The conscious agent, already in essential relation with the true-always, finds the phenomenal to be ever passing from him; while yet he hastens on, with the great work of perfecting his own character for the judgment of the Supreme, Whose relation to the true-always is perfect.

Life of the world to come not as phenomenal but as true-always.

When the illustrious teacher of the nations "reasoned" before his tyrant, "of Temperance, Righteousness and Judgment to come"—we are told that "Felix trembled." He would not have trembled, had not the facts of human nature been in deep accordance with those verities.

XIX.

135. From these beginnings of Religious Faith thus morally recognized, we will diverge to some alleged doctrines of Religion which are shut out, *à priori*, by our first principles, and supply no defect in our knowledge or power. In marking the great facts as to the Supreme Judgment of moral agents, the law of Retribution, and the Life to come, we saw that they were all closely allied with the true-always. We shall find it, on the

False teaching only in relation with the phenomenal.

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other hand, to be a mark of any doctrine which reason precludes our holding, that it depends on the phenomenal.

It must be repeated, that in postulating our religious foundations, we ventured on no previous speculations as to the character, or mode of action, or knowledge, or any "attributes" of the SUPREME. We have contemplated HIM solely as the Moral Arbiter of a world that knows itself responsible—both He and the conscious beings ruled by Him, being in relation with the true-always. We must, if consistent in our argument, bring all proposed doctrines of Religion to the same moral test. At least we should for the present have nothing to proceed upon, if we began with an *à priori* Theology. As moral beings we approach the Supreme only as a Moral Governor; and can allow indeed of no abstract theological, or other conclusions that might possibly come into collision with HIS, and our own natures, as moral, and so unhinge all Responsibility.

à priori Theology not primary in our argument.

136. We saw quite enough, in our examination of the Eleatic Ontology (§ 60, &c.) to warn us against relying on the so-called metaphysical ideas of simplicity, perfection and the like. In such speculations we should be dealing with subject-matter of which we have no consciousness and no experience. We can only think of the Supreme as related to the true-always and to the phenomenal, as really as we ourselves are,—abstracting the limitations which belong to our finitude. We cannot analyze our own consciousness; nor yet our mode of becoming related with phenomena: still less can we understand the Divine consciousness or the Divine mode of Relation with our phenomena, or with any other classes of phenomena,—for they may be many. We only know that the Divine relation to both must be such as to befit the Judge of the moral system. We have neither proved, nor asked, more than this. How God "knows," and how (as some express themselves) He "fore-knows," we are not able to say; except that knowledge is a conscious possession of any conscious being, and that to *know before acting* is necessary to a wise being.—Knowing before our acting accompanies our designing the act: but knowing the act of others before they do it, is not identical with our designing or destining *their* act. Knowledge in every case corresponds with the subject-matter, or it is not knowledge.

The mode of the Divine consciousness or knowledge inscrutable.

137. All speculation *e. g.* as to our own knowledge of the true-always is limited to our consciousness; and, as to our knowledge of the phenomenal, limited to our experience, and

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memories of the past, and forecasting of the possible future. In this sense, both conscious and experimental knowledge may be termed relative. But the Divine consciousness of the true-always transcends ours, and the Divine relation to the phenomenal we cannot measure. They are parallel to a certain limit, so that we may perceive what they are not; but we cannot ascertain all that they are. Morally they correspond with ours,—we saw the necessity of a moral Governor in relation like ourselves with the true-always. There we must pause. God's knowedge is such that He governs this moral creation aright.

138. To identify God's Knowledge with what some for instance have termed Predestination, is to identify the phenomenal with the Divine consciousness; which would be Pantheistic. In that case there is nothing contingent; all the grounds of our Deontology are destroyed, and we depose at once Morality and the Supreme Moral Ruler. Any alleged Revelation, which cannot say to us "ought" or "ought not" is, on the face of it, impossible. Indeed it were a contradiction in terms, to *ask us to accept* a Revelation which tells us that it is certain beforehand, that *we* cannot accept, or reject it—every incident in the whole career of every conscious agent being certain to fall out in the way "predestined." The advocates of this marvellous hypothesis—(predestinated to advocate it, we must suppose, as others are predestinated to wonder at it, and bear,)—are in this further dilemma, that they call this Predestination "Eternal",—that is, *it always was*. It was no divine act, but a state of things always existing: God Himself not being at liberty to choose. They therefore explain their very term "Predestination" as an apologetic euphemism for what others call "fate"—there being they say, "neither past, present or future with God."

Intellectual contradictions involved in the popular notion of "Predestination."

139. Now we have, and can have, nothing to do with any such doctrine, until we have abandoned the belief in our Responsibility as real Agents, and in the Supreme Ruler who is in relation with the true-always as such, and with the phenomenal as such. Such an interpretation of an alleged Revelation, must be false.

And Moral.

The Stoics' dilemma, that of any two proposed contradictory events one or other will eventually take place, and that what is ultimately a fact was never untrue, is similar to the Predestinarian's fallacy, that because either the affirmative or the negative in some matters will take place, it may be known as certain beforehand. It is to confound knowledge of the phenomenal with knowledge of

Fallacy of Stoics and Predestinarians.

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the true-always: it is to identify consciousness and perception: and (which is more to our present argument), it is to deny real contingency in the phenomenal, which is at the basis of all our Deontology.

This is not the place to pursue the matter further, but the supposition of the certainty of the phenomenal future is exposed by Origen against Celsus with much sagacity of observation (lib. ii., *in fine*) from a moral point of view. The philosophy of the subject is dealt with by Maimonides. (*Mishne Torah*, First Book, v. 5.)

140. While thus our principles oblige our rejection of all *a priori* dogmatics inconsistent with them, (such as those of Predestination,) it will be also seen that they must hinder our acceptance of any *à posteriori* claims of dogma, or solutions of difficulties, which at any time are in collision with primary Deontology;—and this will remove controversies of another class.

à posteriori Solutions of difficulties.

The difficulties of many kinds in subjects submitted to our Faith, as well as those which encumber the theory and the fact of our accountability, have never, as we have pointed out (§ 13), at all set aside the fact itself. But the attempts to meet those difficulties have not unfrequently been interferences inconsistent with the grounds of all Deontology. Certain political and social interferences with Human Responsibility already glanced at (§ 40) may of course remedy much; but also create much of the tyranny of others over ourselves as responsible persons. The defect of such interference is, that at best it is legal, and not moral. A similar objection must no doubt be taken to all supposed interference of a merely positive, or authoritative kind, even on the part of Revelation itself; whether for the furtherance of a doctrine or asserted truth, or for the inculcation of a supposed duty.

Fallacy of Authoritative Faith and Authoritative Obedience.

141. To say that a moral being ought to believe anything "on authority only," or to do anything "on obedience only" is a contradiction. There can be no "ought," where the conscious agent is forbidden to examine his consciousness of the true-always; and where even his knowledge of the phenomenal is wholly subordinated to other agents.

While admitting that Revelation is to exhibit authority for its message, still it is inevitable for a moral being to require that his consciousness be appealed to and respected. If Duty be denied, Faith is impossible. We can no more devolve our accountability on an alleged Religious Authority, than on Society, or on the State: for accountability would then cease to be moral, and

Union of Authority and Conviction.

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become purely formal, or legal. Such "Revelation" could make no demand on Faith, for it would be the destruction of that Deontology, which all Revelation is supposed to assist. This, however, will further appear.

XX.

142. We have thus far admitted nothing which is not evolved by logical necessity from the one fact of Responsibility, which was based on the indisputable approval or disapproval inwardly given by all men to certain acts of themselves and their fellow-men. As we profess to have nothing to do with a Religion or a Revelation which does not stand on the fact of Responsibility, our argument is limited to simple issues.

Idea of Revelation hitherto assumed; Assistance from the Supreme.

The idea of Revelation hitherto dwelt on, involves little more than the possibility of increase of knowledge, and other alleviation of admitted difficulties of the present moral agency of the world. The only source from which we have supposed this alleviation or assistance to be derived has been the Supreme Moral Governor Himself, in Whose rule such assistance to moral agency might be an element.

Limits of our Judgment of Revealed knowledge entirely Deontological.

143. If the assistance were derived from any being superior to ourselves, or from any of ourselves superior to the rest, it would still be subject to the ultimate Judgment of Him Who is Supreme—for otherwise He would not be Supreme—as our argument has required (§ 48). Any such communication to us, when submitted to our consciousness must (as we have said, § 125) be estimated by us within the limits pointed out. But with this exception, that it shall not essentially supersede our previous Deontology, or destroy its foundations, we clearly have no right beforehand to say in what other respects the new Revelation, or proffered assistance may be given. It is quite possible, for example, that the additional facts or truths imparted by Revelation may need, and even give, some additional powers for their discernment, or some elevation of the powers already possessed, such as may come from a higher education, or new circumstances. A telescope of higher power may discover objects unknown before; and there may be means of a far-seeing moral discernment; there may be faculties which find at length a remoter range, inspirations which surpass our common apprehension more than genius exceeds the ordinary gifts of understanding. We have no right to assume

Yet our moral powers may be elevated, to know, and judge.

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beforehand, that this may not be. We do not know, until we find it so, or not, by experience.

The tone of Revelation would be positive.

144. The tone assumed by a Revelation may in some cases be very positive; The authority which a true Revelation asserts, where it proclaims itself at all, would be of no hesitating character: but this does not touch our position.—The very tone adopted by our Supreme Teacher (judging by similar facts) might even increase our power as we accepted the truth.

145. Thus the positive tone in which a Revelation from the Supreme Governor might be expected to address us by no means interferes with Deontology: rather it may greatly aid us. Even the morality which is natural to us comes in fact, at first, in the form of positive injunction and prohibition, from immediate superiors, though our conscious agency at length accepts it, as inherently right. Considering then that Revelation is defined as coming to those who have need of such assistance, its approach would be likely to be thus authoritative, and our acceptance take at times the outward form of obedience. This may often give rise to the superficial thought, that *obedience of acquiescence* is sufficient for the ends designed in Revelation. But this would be an assumption: and indeed obedience of mere acquiescence we know is less than individual responsibility requires, and might even (as already intimated) involve collision with our relation as conscious beings, towards the true-always.

But this does not demand mere obedience of acquiescence.

146. Any false theory of obedience would open a chasm between objective Revelation and the human consciousness: and yet it may be observed, that the more definite a Revelation becomes, the greater is the facility with which it is assumed by some to supersede, instead of assisting, moral agency: though it needs but little reflection to see that mere obedience, as such, is not moral at all.

Obedience must be moral.

If moral agency implies self-control, it is plain that a mechanical obedience is a surrender of self-control —a simple abnegation, as far as possible, of all further responsibility. Moral obedience must be the acceptance of principle, as well as submission to authority. We are thus responsible for *receiving* and not merely submitting to truth.

147. Further: However large may be the possible addition of facts or knowledge discovered to some men by a Revelation from the Supreme Governor, as soon as it takes its place among the elements of human training and finds its fit rank among the moral circumstances in which we live and act, it becomes

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subject to the like moral vicissitudes. If our responsibility has anything to do with it, no part of the Revelation should through any fault of ours continue merely an external fact. So long as it remains so, it is to that extent inoperative. That which is external may lose influence very soon, and a positive law is as if morally dead, until it becomes an inward principle,—a power.

Revelation cannot continue merely external.

148. Some illustration of this may be had from marking the case of any system of Positive Duty which has had wide acceptance among men, and so proved its compatibility *pro tanto* with their nature. The law of Moses *e. g.* with its very definite and positive provisions, professed to come from GOD, and to be morally elevating; yet the Lawgiver was explicit in his assurances to the people that the previous ordinary rules which govern moral affairs would not be departed from in their case. The people, and their new Revelation, would be subject to the contingencies of life and action; and even the benefit of their positive law might, by the people's misuse, become less and less. The circumstances of the introduction of that law, and the original influences, would naturally pass. After a few years, or generations at farthest, men would look back on that as obscure history which to contemporaries had been vivid reality. If it had effected no lodgement in the conscience and heart of men, the tradition would grow faint and even change, and, as a law only, tend to become void of power. They were responsible, we find, for having that law, and then responsible for not responding to it.

Moral illustration from the Revelation given to Moses.

149. It is certainly very suitable to the responsibility of our nature, that external things thus have but a gradual influence on our inner life. It is a just counterpoise to that power of habit of which we have already spoken: and which is not to be thought of as merely mechanical. The external lives and has power to us in proportion as it corresponds to the internal. Any other conclusion might be destructive of Deontology; and even if not so, would oblige not one Revelation, nor several, but a constant series.

150. If we pass in like review the phenomena of Christianity, we shall find the same moral results.

The mighty events recorded in the Evangelical histories as introducing the Religion of Christ passed away, of course, with the generation which beheld them, many of whom naturally expected them to usher in the close of all things. Regarded externally, those marvels seemed to the natural eye to grow more and more dim as time went on.

Moral review of the same case among Christians.

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The solemn echoes of the "Sermon on the mount" died away at evening-fall, like all other sounds of earth that day. Some men had been touched by them; but their memory soon began to fade. Did any one of them even think of writing down the words?—The same reflection arises as to all the rest of the teaching of the "Greater than Moses." The next generation had a record of that teaching; and also a new social organization in which it was transmitted. Later still, it was translated into various languages, and read periodically in the perpetuated societies which cherished it.—Centuries rolled on; and copies of the records, subject to the same kind of vicissitudes as other writings, became matter for the criticism of some, and the neglect of others. Then the genuineness of the original documents, their authenticity, completeness, and authority,—questions of the phenomenal,—would be inquired of, and that with increasing strictness, perhaps, in proportion as they were judged objectively and historically, by those who had frustrated their responsible advantages by not receiving inwardly the principles which make a Religion to be spirit and life.

The Christian Literature.

151. Just the same observations naturally occur in reference to the system, or polity, set up by the first teachers of the Christian facts, the first authors of the Christian literature. All the unusual circumstances which arrested the attention at first, whether of the populace of Jerusalem, or the Athenians on Mar's Hill, or Cæsar's household at Rome, had to subside into their due place in the system of moral agency. The Christian polity had to shape itself as it grew, in some accordance with the social organization around it. Succeeding generations were responsible for dealing with the Christian system more and more as an institution pertaining to the moral order and government of men, which could not be ignored. It was an external fact, tending to become identified with the law and social system of the world; with this distinction, that it had a power of its own (which external law alone has not) of moulding the inner life of those who so accepted its external Revelation as to make it an internal *principle*.

The Christian Polity.

152. The Christian Polity, or Church as it is called, viewed as an external system, is, and must be capable of being, a part of the government and civilization of the world; but viewed in reference to its own inner life, continuous and influential from the first, it is capable also of forming the individual character. And much as the people who had the Law from Moses, forgot the wonders of Egypt and of the wilderness, at the time *e.g.* of

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Manasseh's reign; many Christians of later generations were but little alive to the vivid realities in which their system began. It was part of the Responsibility of the individual in every case, to accept as *principle* the objective Revelation; and any kind of reception of Christianity which does not aim to identify it with the personal conscience is inconsistent with Deontology.

Objective and subjective character of Christianity distinct.

XXI.

153. This internal reception of a Revelation, or Religion—its assimilation, if it may be so expressed, in our moral system—would seem indeed to be an integral part of that "Assistance" to Deontology which may be so much needed, (§ 10, &c.) when we remember that the perfecting of the individual character is our end. (§ 95.) What has thus far been said of Revelation, has regarded it first as assistance to knowledge; but we must say something more as to the definite effect on moral power; an effect which may be not simply the result of knowledge, but a specific energy.

Internal Reception of Revelation.

154. Whatever we may think of the ideal condition of moral agents, it is evident in fact, (as we have seen) that multitudes, who are subject to approval and disapproval, both of themselves and others, have wide diversities of power as well as knowledge. Indeed the perception of "ought," and "ought not," by no means corresponds at all times with either intellectual or moral power: and, not unfrequently, capacity is raised, and probation advanced, by practically elevating the sense of "ought."

Many influences of others through education and society, of which we are aware, and some which lie beyond our scrutiny, affect the moral power of individuals. The fact that we are so influenced by agents around us is a proof that it is not unreasonable to admit the possibility of gratuitous aid to responsible beings; and gratuitous moral aid, (or, what in Christian Theology is called "grace") is, in many aspects, a kind of need to the accountable agent—so that it has, by some, been thought to be the only explanation to be given of the existence of moral agency at all, that inward moral assistance has been *always* rendered, varying of course in degree. The theory, if it be such, may at least show, that there has been felt to be a congruity in the thought of superior aid being rendered to the moral power of the individual.

Idea of Grace as a gratuitous Assistance.

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155. But we are familiar with the fact that the intellectually strong, and the morally noble, increase the power of those with whom they come in contact; so that the general truth is indisputable. In what ways it might please the Supreme Governor to impart this additional moral power, seeming to be at times a sort of spontaneous energy, we could not presume to determine beforehand; but it would seem to be not improbable, or rather it is in accordance with probability, that such mode of assistance should be analogous to the influences of man on man in the natural system of the world.

Akin to influence in some respects,

156. The social order of things proceeds from the individual to the family, and from the family to the wider circles of human neighbourhood. If the Religious order should proceed in any similar way, there would seem to be no objection to it. For a social being a social order of Religious influences would seem a kind of necessity. Just as the wants of responsibility, in the individual agent, suggested to us the need of a Supreme Governor; so the wants of a community of such agents lead to the belief that a true Revelation would touch the polity of human nature, as individual probation might need.

through human media Divinely directed,

and connected with human Polity.

157. But it does not belong to the present argument to define Revelation in minute detail. If our general conclusions have ground for acceptance, special development will follow. Revelation will speak for itself, and hold its own ground, finally, in relation with the true-always. They indeed will personally of course, be the losers who internally reject, (as moral beings can,) any assistance to their knowledge of duty, or their power to perform it. Hence the obligation, and the wisdom of examination in such a matter. In this respect, the rejector of Revelation—really such, will appear on the same footing as the rejector of virtue; each being thus in opposition to the true-always. — If indeed a Revelation were only a system of opinion certified to us externally, the case would be different. We might regret that a man refused to accept it, but we could not then adopt towards him this tone of warning: but in proportion as it belongs to our moral nature, informing its ignorance, or supplying its defects, the responsibility of owning and acting on it is strictly moral. As assuredly as we must attach the gravest consequences to immorality commonly so called, so also to conscious irreligion.

Responsibility here implied.

158. For the happiness of a conscious being must consist in his conformity, according to his power, with the

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good, and true-always. If he fails in his conformity thereto, he is in opposition to immutable realities of being. What may be the condition, in the nature of things, of persons who, at the final adjudication of the moral system, or who at the termination of life's probation here, have wilfully failed in duty, and so are in opposition to essential reason, and essential good, our natural Deontology does not inform us. But if additional knowledge and power imply responsibility in proportion, the conscious rejector of Revelation, we cannot help seeing, incurs penalty beyond others.

What Failure in Responsibility may, or may not, be.

159. When we bear in mind how permanently all the opinions which we form may influence our character and action, the duty of forming right opinion forces itself on the attention even of the least enlightened moralist; for opinion has relation to both knowledge and power.

Inference as to Religious Responsibility:

Of Religious opinion, the influence on our whole Deontology seems well-nigh unlimited. We must recognize, however, in all equity, even in this, the original distinctiveness of the individual. The power, the capacity of virtue, the discernment of truth and duty, are widely different *ab initio* in man and man: and the responsibility is also graduated. The eventual justice of the moral system is only safe in the hands of the Supreme Governor.—But of these aboriginal differences something further should be said.

160. In entertaining any opinion, or forming any judgment, or in contemplating any action, there is in every rational being some estimate of the Possible and of the Probable. The difference in such estimate between different men may evince various gradations of the *capacity of insight* into that which lies beyond the present, which may, more or less readily, become Religious Faith. We know that the various degrees of sensitiveness to moral truths, commonly so called, indicate widely different states of conscientiousness in morals. We do not suppose that the sanguine temperament of one, or the dulness of another, precludes accountability: but simply modifies it. So what is sometimes termed the "temper of faith" is far from uniform, among those who are nevertheless responsible. Yet no accountable being is destitute of a faith of an initial kind within his very soul which will at least respond to the prophetic words—"Say ye to the righteous, it shall be well with him: woe to the wicked, it shall be ill with him." But, (what is more rare,) a persistent continuance in righteousness under adverse circumstances (which all would applaud,) is certainly of the nature of Faith of even a higher kind.

Its gradations

implying a primary element of faith.

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161. It seems to be undeniable, that in dealing with realities there must be that within us which corresponds with them. No critical analysis can supply the place of this. It is the possession of eyesight, and not any investigation of the laws of light and vision, or evidence as to their operation, that will enable us to behold the phenomena around us. The surest processes of reasoning, or the clearest deductions of science, could not convey to one born blind our knowledge of colour, or of the beauty of form. So in morals; the good man understands goodness; but he whose conscience is debased has but imperfect perceptions of virtue; while he who is wholly vicious will comprehend nothing that is noble, and disbelieve the very existence of purity.—In the same way it is taken as a sufficient account of some men's dislike of poetry, that they have but little imagination; or of the inaptitude of the multitude for accurate thought, that they are "practical" in their occupations: so also will the objects of Revelation seem to stand related to our capacity.

Parallel of moral and other knowledge.

162. If we had nothing in us capable of Religion, man would never have continuously aimed at another life beyond this present, he would not have believed in it, or prepared for it. There is ever a subtle alliance of our hopes, and our intellectual consciousness, and our moral perceptions, which is not unfitly condensed in the familiar definition, that "faith is the hypostasis of things hoped-for, the ἔλεγχος of things unseen."

XXII.

163. No honest examiner of human nature will suppose from what has been thus said, that the Responsibility of the less capable conscious agent is questioned in any department of Deontology; nor that the duty of reason is undervalued, even in the least capable. The argument for a higher moral knowledge, and augmented power, has but exhibited facts of our nature. All are concerned in knowing and doing right:—and some may attain it in a higher degree; though few are capable of rendering a complete account of the grounds either of faith, or duty.

Reasoning not disparaged by Faith.

Even they who are best qualified are aware that they have perceptions and convictions, both as to Virtue and Religion, far deeper than any external reasons, and as distinct from such

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reasons as the laws of optics from eyesight. The vulgar antithesis of faith and reason, is somewhat childish. Probably every one who has faith at all, has it, in most matters, to a greater extent than the evidence examined by him would alone account for; and the residue, at least, of his conviction, however imperfect, is from something in himself.

164. We admit the wide differences, from the outset of our careers, between man and man. It is part of the philosophy of man, that each is different from every other, notwithstanding all our sameness. We must not forget, however, that we develop, mentally and morally, and that the original differences may be much changed, even by ourselves. Original obstacles to our mental and moral advancement may be removed, and even original deficiencies sometimes supplied. We are powers. Materialism forgets this, and prefers that any thing may be a power rather than man. Yet it is a fact that by our self-exertion, even if we be of inferior nature, we may rise. The unimaginative, and the "slow of heart," need not always remain at the same level: but reasoning will not work goodness, nor evidence produce faith, in those who by neglect of moral self-exertion have lost the "witness within." "He that believes has witness in himself." The "lost" have no "root in themselves." *St. Matt.* xiii. 21.

No antagonism between them.

For Faith, as well as goodness, must be personal. We choose whether we will be virtuous; we choose whether we will be religious. Any one can decline it: He is free—he is responsible.—We think of him who does not resolve to be Religious, as of one who declines to recognize a certain relation in which he stands to the true-always: who will none the less, we must repeat, have to encounter, at last, the realities thus ignored.

We choose both Virtue and Religion.

165. Then, finally; the ascertainment of the Religious objects is a duty which the simplest common-sense must recognize, when once it is perceived how wide the extent of our Deontology may be. If a man has a false *object* of Faith, he is reckoning on that which has no reality at all. This is not the same as being inaccurate in thought concerning the object, or imperfect in the judgment of it,—(for that happens to all of us:) it is, that the man who has a false faith is dealing with shadows and fancies of his own mind, and not with those facts which, whatever he thinks, he will have to meet, because they are facts. The course of real events moves sternly on, overwhelming in its progress all theories of the sincerest speculators; and so must the realities of the world to come, confound at last the rejectors of truth.

The ascertainment of Religious truth is necessary,

Be it remembered,—that our ultimate Responsibility for

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faith, thought, and action, must be all moral. In this every one who loves goodness will rejoice. Let any truth come before a man of elevated aims and high moral nature, and his heart goes out towards it. So far as our moral nature is at all in our own keeping, or control, we are so responsible, that we surely have a consciousness of guilt if ever we find ourselves shrinking from the loftiest ideal of good.

and part of our strict Deontology.

166. Faith has ever its own grand reason within for aiming at the highest: and has a certainty all its own. And as the man of genius in the pursuit of science may be long sustained by some inspired thought, which he is yet unable to demonstrate, but is sure of it as true, though the many may smile at it as a dream; so the man of faith has in himself a vision of things unrecognized by sense. True, he may demonstrate much; but he sees more than he yet demonstrates, and loves the purest truth, even when most faintly seen. The realities of faith, like the true-always, existing apart from the phenomenal which alone admits of definition here, may seem dim to those who would only ascertain them *ab extra;* but such dimness may indicate true elements of grandeur and of power. Realities which our nature refuses to dispense with, (notwithstanding all our defective apprehension,) and which recede into their own vastness as our finite measurements would approach, surely remind us that they belong to another sphere.

Certainty of Faith

and its analogy to the true-always.

167. And now in looking back on the course of the whole argument thus pursued to its close, let it be remembered that it is addressed to those only who believe that the character of men is now being formed; and that men are Responsible beings, justly liable to Praise and Blame; yet that we are surrounded by difficulties connected with both our knowledge and power, which call for alleviation. "Whatsoever things are true . . . whatsoever things are good, if there be any virtue, or any praise, think on these things."

We have appealed to each man's Consciousness and Observation. We have not dogmatized, we have not speculated; we have reasoned—as we promised,—on the whole range of the ascertained facts; and if any be dissatisfied, we still cannot help the conclusions of logic. Our Philosophy is strictly Positive and Rational. We dare claim for our Religious conclusions nothing less than this. Just as a false theory in science about oxygen and hydrogen, or about the distances of the stars, might be misdirecting and mischievous for a while, but could not alter the state of facts; so,

Conclusion.

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false views in ethics, and contradictions of Religious truths, may be harmful for a time; but the facts will remain; and the Theologian and Philosopher will be content with them, whatever they be.

"'Tis Reason our Great Master holds so dear;
'Tis Reason's injured rights, His wrath resents;
'Tis Reason's voice obeyed, His Glory crowns."

XXIII.

POSTSCRIPT.

(*Ad Fideles.*)

168. It is not competent to any one to avail himself of the argument which has been pursued, without being prepared to follow out its principles when he comes to consider his own interpretation of alleged Revelation—his special Religious doctrines and practices. Unreasonable forms of nominal Christianity have quite as much to fear, as the philosophies of avowed unbelief, from the frank acceptance of those Deontological foundations to which we have alone appealed.

This is plainly not the place, as we have already said, to present a formal vindication of any system of Religious faith, or "its evidences." We have so carefully avoided the distinctive dogmas of theology, that we have, in every particular involving our argument, abstained from abstract definition, and regarded even the most primary truths from the Deontological point of view only. But it is required of us, in honesty and consistency, to say what is henceforth demanded by our argument, in the case of religious persons who would accept it at all.

169. First, they must acknowledge that the method which we have pursued shuts out the possibility of all collision between Religion and Ethics. We have no option, then, but to reject anything, however strongly attested *ab extra*, which places these in real antagonism. Our Deontology can be but one, throughout.

Secondly; that though our method began by assuming no more than that "We are,"—and that "the facts of our nature may be taken as the basis of its science," we have not

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desired to throw doubt on other methods of advancing to the same questions as are here treated; but we have given precedence, (with Coleridge, and Kant, and the best of the moderns,) to the Deontological, as more certain and clear, and setting practical limits to all later speculation. Our assumptions at the outset were such as not only to need no artificial definition, but to admit no denial, if men are to think in any way on the subjects proposed. Our first step, like that of science, ought to be such as could not be disputed, and to be an appeal to consciousness, and fact, and not a deduction from premisses. It is only when some such first step is taken, that men are in the sphere of critical reason.

170. The first step, for instance, in the usual *à priori* Argument of Theology is the assumption of the idea of Causation. The first step of the *à posteriori* argument is the idea of Design,—both of them the battle-grounds of objectors. The first step of the Metaphysical reasoners is the assumption of certain Ontological ideas. The first step of some sectarian theologies is the assumption of the idea of Creation. Our beginning is easier, for it has, we repeat, the advantage of being unquestionable, by those who mean to reason at all.

171. But if, at our present position, it is thus incumbent on the believer of any form of Revelation to see that he accepts nothing in discordance with previous facts of his responsibility, there will be an appeal to his consciousness throughout, which he cannot morally ignore. His Christianity, whatever it be, must not contravene the true-always. Nor may it, in the sphere of the phenomenal, forget the limitations and relations of the finite.

172. If, with St. Paul, any one is ready to admit as vital to his Christianity, the doctrine and fact of the Resurrection; if, with St. John, he founds his faith on the Incarnation; if, with the Church of later times, the historic Creeds are deemed to be essential, he takes these positions because they are compatible with the whole Philosophy of Duty,—the reverent acknowledgment of the true-always and the relation to it of the phenomenal. He must think, *e. g.* that there may be a Philosophy of the Resurrection, simply assuring the needful identity of the individual moral agent, throughout all phenomenal changes; a Philosophy of the Incarnation, loftily vindicating the required relation of the finite to the true-always; a Philosophy of Providence, as the ultimate and indispensable solution of moral difficulties; a Philosophy of Worship, as the habitual recognition by the individual of the true-always; and of Prayer as the expression of a moral relation to the phenomenal also; and of Praise as the re-

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joicing approval of the Highest Good. There must, in a word, be a Philosophy of Life as Responsible throughout; nor would it be complete without a philosophy of Death, as consummating this elaborate work of Probation in what ought to be its greatest crisis.

173. That is a satisfactory form of Christianity (and we possess it) which can thus be pointed to as a Positive Institution, and a sure Philosophy, in which the facts of Human nature at length find their solemn explanation, and the wants of Human nature their supply: an institution whose claim may be challenged by its Teachers to be as broad as the whole world of moral agency—as "quæ semper, quæ ubique, quæ ab omnibus,"—"et scitur et legitur, verè epistola Christi, ministrata à nobis, et Scripta non atramento, sed Spiritu Dei Vivi, non in tabulis lapideis, sed in tabulis cordis."

The Chairman.—I am sure I need scarcely call on you to return a unanimous vote of thanks to Dr. Irons, not only for the valuable paper which he has just read, but once more for the two preceding parts of it. No one can have listened to a single passage of his valuable writing without admitting that it contains the deepest thoughts on some of the most important subjects on which men can enter. Our best thanks are due to Dr. Irons for his valuable thoughts and reasonings; but as we know that there are no thoughts and reasonings which will not admit of others opposing them, and as Dr. Irons has written these papers in order to invite discussion and the free expression of thought; and as I am given to understand that there are some gentlemen present who differ from the reasoning and conclusions of Dr. Irons; I beg to call on those who have any objections to offer to the paper, rather than on those who agree with the Doctor's line of argument, to favour us with their views on the subject.

Mr. Austin Holyoake.—I did not anticipate, previous to the remarks which the Chairman has just made, that I should feel called upon to offer any observations on the paper which we have heard read, and which forms part of some previous papers on the same subject. The secretary of this excellent Institute has been so good as to send those previous papers to me, but I did not receive them until Saturday, and I have not had time to read them since. I am, however, induced to speak on this occasion by the conciliatory words of the learned doctor, the author of the paper; and I must state, at the outset, that I have been somewhat disappointed with the argument of Dr. Irons, who is a man whom we all know to be a reasoner and writer of very great ability. In taking up this subject he could not have taken a topic of more permanent interest and concern to the human heart, but he has treated it almost exclusively from what you will pardon me for calling an orthodox Christian point of view. Now, I will just state how this matter appears to me—and I have thought upon it very intently and earnestly for

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many years ;—and if I have not come to the conclusion that most of those around me have come to, I can assure you that it has not been from any wilfulness of disposition. Dr. Irons has told us that a man can believe if he likes. Now, I beg to say that so far as my experience has gone, that is not true of all persons. In my own case it is not true. I was born of religious parents, and in my early days I had a religious education. My mother was a most devout Christian—a most devout believer, and I may say, in passing, that she was a Calvinist, and held that doctrine which I was pleased to hear Dr. Irons demolish—I mean the doctrine of predestination. In my subsequent years I have not been religious. I cannot be religious now, from any information or revelation (if you will allow me to use the word in my own sense), that has ever been imparted to me. Dr. Irons talks of the responsibility of man to a higher power—to the moral Governor of the universe. The only responsibility that I can understand is that of man to man. That moral Governor of the universe, whom the doctor sees, I do not see. I look around me,—I see the inequalities of society, I see the different developments of men and women among us ; and I see that they act more from their own wills and impulses than from any superior moral governance that may be supposed to be directing their actions. And, if there be a supreme moral Governor of the universe, how is it that all men act differently—that some men, with the purest and the best intentions, will work wrong to their fellow-men? And how is it, if there be a revelation from God to man, that I have not received the same amount of revelation that will induce me to receive the religious truths which Dr. Irons appears to hold so profoundly? I do not believe them, and I cannot in my own mind comprehend them ; and I beg you not to suppose that I say that from any flippant notion, or from not having duly weighed the consequences of my words——

Dr. Irons.—No, no.

Mr. Holyoake.—I say that I cannot comprehend anything above and distinct from nature. As I understand it, a supreme moral Governor of the universe must be a being, an entity, a something distinct and apart, and altogether outside of nature—a being who made all things, and who is governing all things. If He be a being of all goodness and all wisdom, how comes it that all men are not good, that all men are not happy, and that we do not all view Him in the same light? Now, I have tried earnestly and sincerely if, by searching, I could find out God, or, in other words, whether I could see sufficient evidence in the universe to justify my belief in something distinct and apart from nature, but I have not succeeded. I recognise nothing apart from nature; and what a revelation may be from supposed supernatural sources, I know not. I should like, if any gentleman has the knowledge, for him to tell me what the signs would be whereby I should know when I received a revelation from God. All the revelation that I can imagine any human being receiving, is that which will arise from superior education, from extensive knowledge, and from a highly-developed mental organization. But I understand the doctor to mean that a revelation is

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something that comes to a man distinctly—something apart from his reading, and from all the ordinary sources of information—

Dr. IRONS.—I have not said that. I like to hear what Mr. Holyoake is saying so fairly, but most of the things he has said show me that he has not read what I have written before ; for in these papers I have laid aside throughout the notion of what revelation is to be, except as to certain main outlines which seem to result from the principles laid down in the papers.

Mr. HOLYOAKE.—Then I will not pursue that argument. I will only say that I am most anxious myself to have my mind, if possible, settled on these momentous questions. In spite of ourselves, say what we will, the desire comes up in our minds (hear, hear), and we are anxious to know the truth. But we feel that we are surrounded by a vast and profound mystery which human knowledge cannot penetrate. (Hear, hear.) I cannot lay aside reason and take up faith—I cannot say that I believe, or have faith in that in which my reasoning faculties will not justify me. Take, for instance, the future life which the doctor alluded to, and the question of retribution or reward in a future world. That, again, appears to me to be a contradiction of the nature of the supreme moral Governor. I cannot conceive how a supreme moral Governor of the universe can make His children so imperfect that they should err, that they should commit wrong, that they should give pain to their fellow-creatures ; and that then, in consequence of their blindness or their want of moral perception, they should be punished in a future state of existence by the being who made them, and who must have known beforehand that they would err, He being all-knowing and all-seeing. And unless you imagine a being who possesses these attributes, I do not see that you have anything to venerate and worship. So far as I have read and thought, the difficulty with me has been, not for men to form an adequate conception of the Deity, so much as for man to form a Deity, or portray a supposed Deity, that should be adequate to the requirements of man. All the theories of a Governor of the universe, of a God, of a supreme Being, seem to me so contradictory, and to fall so far short of human requirements, that I have not yet seen anything to arrest my attention, and I therefore remain, in spite of myself, and in spite of what Dr. Irons may think, a non-religious man.

Rev. JOHN MANNERS.—The hour is so late, or else I had several points which I should have liked to have brought out in reference to Dr. Irons's paper, but it is now impossible to enter upon them. There are several things which I do not exactly understand, and others in which I do not quite agree with Dr. Irons ; and there are two or three grand elements left out. But I think the observations of Mr. Holyoake are so important that, if you will allow me, I should like to say, with all respect and kindness, that I should have the greatest possible pleasure in endeavouring to meet all his objections. If a man is honest and sincere, and really desirous of the truth, I should have the greatest pleasure in devoting any time I may have to answering his objections, as I feel certain of this, that there is a proper solution to his problem, and that in the end he would acknowledge it solved. There were one or two points touched upon by Dr. Irons which might have been carried

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further. Sceptics often admit that they are not exactly right, and want information; even Mr. Holyoake says, "I should like to know this, and be satisfied of that," and so on. But whence springs this desire to know? Why should there be a desire to seek after the truth? The answer is, Man wishes to find God; for God is truth; the only One who can say, "I am the truth." Still, I would not beg the question. I would go into all that gentleman's difficulties, leaving revelation out for a time. I do not want him to assent to anything which he does not believe, but I want to get to the true and honest ground of his own heart; to get into communion, as it were, with his own being; and to ask the question with him, "What is it all about? Why was I created?" Answers to these questions would satisfy his mind, and lead him to an apprehension of truth, and clear away doubts and difficulties. There is one point in Dr. Irons's paper near the close which I should like to notice. Dr. Irons quoted some lines from Young. But there is this element which we must take into account, that human nature is not now what it was originally, for there has been the declension, or the fall of man. There are numerous doubts and difficulties and perplexities strewn around us, and all the faculties of our being seem to require something to rebalance them, and put them in order and harmony. This is one of the things that require to be taken into account. Then there are many terms used by Dr. Irons which I would like to have properly defined. What does he mean, strictly, by "the true-always," "accountability," and so forth? If we were to have these things properly defined, we should get at the truth without so many difficulties as we have now to contend with.

Rev. Dr. Rigg.—I feel that we had better either adjourn this discussion or bring it to a very speedy conclusion. I hardly know which is the best course to adopt. At the same time I do not think that the remarks made by Mr. Holyoake should pass unnoticed. I do not think it would be respectful either to him or to us, to let them pass without remark. I may be allowed to say that I greatly admire Dr. Irons's papers. He knows that I have not all through agreed with him; but at the same time there is a massive weight of thought and argument about his papers which I admire, though I do not quite think that his basis is so unexceptionally easy as he seems to suppose, and upon that point I will say a word or two. Dr. Irons thinks, for example, that his method of reasoning is simpler and easier than the *à priori* argument, based on the assumption of the idea of causation. I rather suspect that he assumes the self-same thing at bottom, which any one assumes who starts upon the basis of causation. I believe that those parties who would say that the assumption of causation is a *petitio principii*, would also say that the assumption of a sense of duty was equally improper and gratuitous. The moment you assume duty you assume a moral Governor and a God; and though I think we are philosophically at liberty to assume the ground of duty first, as we are to assume the principle of causation, yet I apprehend that those parties who deny the one will deny the other. In truth, what is it that lies equally at the basis of one and the other? It is the power of self-determination that lies really at the bottom of the argument from

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cause to effect. You have a voluntary power of self-determination—of producing effects by your own will (which is but another way of saying a power of self-determination)—and that lies, as the most essential element, at the bottom of the argument from causation, and at that from duty also. Take that away, and you can have no conception of duty—all deontology vanishes like a dream. Legitimately, the philosophy which depends on the law of causation as its first principle, assumed or taken for granted, is the self-same philosophy as that which Dr. Irons himself has gone upon throughout the whole of his argument. Mr. Holyoake has brought forward the old arguments—arguments which are very serious, and which have filled many a heart and soul with agony—but still the old ones. Mr. Holyoake admits, what I think we ought all to feel in regard to the present position of the argument as between believers in revelation and those who do not believe, that the point is narrowed to a belief in nature or a belief in revelation. Mr. Holyoake does not say, "I am an atheist"; he says, "I cannot find any reason for believing in revelation, or believing in anything except nature." But Mr. Holyoake grounds that on an assumption which I believe he himself knows must be fatal to his whole superstructure. He is committed to this: he does admit that there is some duty and responsibility as between man and man. I do not believe, that from a belief in nature alone, there can be inferred any duty or responsibility as between man and man. (Hear, hear.) I believe the word duty has no sense or meaning upon that ground. You say you can appreciate nothing above nature or apart from it—that you know literally of nothing beyond humanity and nature, and will stand by that. I can quite understand a man standing by that; but in that case he must give up duty. He must give up all talk of honour, except as a mere echo; he must give up all talk of morals, except as a convenience; he must give up all law; in short, all ethics. All these must go, unless we are prepared to believe in something besides nature. Mr. Holyoake shakes his head; but I think as profound men as Mr. Holyoake have come to that conclusion, which will stand, whatever else may stand, and whether he or we be right. The difficulties he puts forward are very serious and awful; so serious and so awful that, looking at them alone, a man might well be (I had almost said) logically justified in not being able to receive the truth of the existence of an Almighty Governor. I do not wonder that a man looking at them alone should feel and say, "I cannot accept,—it transcends my powers to believe in a Being from everlasting,—a being outside the universe, or if identified with it, yet in some sort with a will distinct and apart from that which means the mere life and law of the universe—I cannot realize a conception so immense, stupendous, terrible, as that of this Will and Being independent and apart! Sir, the reason I am obliged, notwithstanding, to believe in a Deity is, because the difficulties on the other side are far more immense, far more stupendous. It is difficult, I admit, almost impossible to form that conception. But, then, has Mr. Holyoake ever put to himself the difficulties on his own side? After all, these things come to a question of fact—of induction, or of deduction upon the basis of a true

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induction, and this is our answer. We go upon facts. I hold that a true philosophy, dealing with facts, leads us to the conviction that this nature must have a mind connected with it, which mind plans and designs and purposes. But a man says, "Here is nature; I believe in nature and in nothing else," and that man plies me with difficulties as to a personal God. But what are my difficulties compared with this notion of nature and nothing else? He says, "How can there be a God apart from nature?" I ask, "How can there be nature apart from God?" He says, "How can there be a God, in conception at least, before nature?" I ask, "How can there be nature, even in conception, before design, before the plan of the whole wondrous and marvellous economy which spreads itself forth to our view?" The more we look at it, the more we shall see that the difficulties involved in the conception of nature without God amount to contradictions manifold, and that it is also weighted with the destruction of morality and of all that belongs to domestic purity. When I look at the logical difficulties on the atheistic side, and at the moral ruin of the whole universe—morality committing suicide, and going down headlong into the bottomless gulf,——I confess I have no doubt or difficulty, notwithstanding all Mr. Holyoake can advance, in saying that I must believe in a moral Governor, in a Supreme God; and I accept the faith with all its terrible mysteries, humbling myself in the presence of those mysteries, and in the presence of the God of mystery, who is also the God of truth.

Mr. Reddie.—I should like to make one or two remarks on this all-important subject. I regret that Dr. Rigg has left; but he was not so far in antagonism with Dr. Irons eventually as in setting out he appeared to be; because the argument in Dr. Irons's papers is especially based upon that sense of duty which men recognize generally, and which is very rarely denied even by atheists. Dr. Irons therefore goes upon the consequent assumption that we are all free agents, and Dr. Rigg's conclusion is based upon that. That also affords a complete answer to Mr. Holyoake, when he says that he does not believe in a moral Governor, expressly because he thinks there is something so monstrous in the state of the world and something so altogether wrong. For that very idea of "wrong" concedes the whole matter. Dr. Irons simply requires, as the basis of his argument, a recognition of the fact that there is what we call right and wrong, or, in other words, what we praise or blame. Mr. Holyoake's other difficulties, as regards retribution, simply come to be the difficulties felt by the heathen, or by those who do not know God's revelation, inasmuch as those difficulties are entirely got rid of by that revelation, which Mr. Holyoake, notwithstanding, unhappily rejects. If the revelation of God did not make those difficulties less, and in truth give us a solution of them, I venture to say that reasonable men would almost be bound to reject revelation. But, on the other hand, I think that Mr. Holyoake ought to know, that the revelation which is put forward for his acceptance is not that of a God, who, like an inexorable fate, first makes imperfect beings, and then punishes them for being imperfect. We don't believe that. We admit

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that we are free agents, and therefore we cannot blame the Deity for our wrong acts, done against His will. On the other hand, suppose there were no Deity, what could hinder our being free? I presume Mr. Holyoake will not say that he is not free; he has, at least, not argued mainly from that point of view——

Mr. HOLYOAKE.—But I do maintain that.

Mr. REDDIE.—That you *are* free?

Mr. HOLYOAKE.—No; that I am *not* a free agent.

Mr. REDDIE.—Well, it is difficult to argue with a man who denies his free agency. But surely Mr. Holyoake will not contend that he was not perfectly free to stand up and make these remarks, or not to do so, a moment ago——

Mr. HOLYOAKE.—I stood up because I could not resist the feeling that prompted me to rise.

Mr. REDDIE.—No doubt a feeling prompted him to rise; but I say he was free to yield to such prompting, or not to yield. He will very likely feel similarly inclined to interrupt me as I proceed; but considering the inconvenience of doing so frequently, or that the Chairman might not permit it, he will probably resist this inclination and not do so. But I say he is free, and that it is his own act, whether he rises or sits still. But if a man gravely tells me, that what he does he does without his own will, I feel I cannot very well argue with him. I believe, however, that the freedom of the will is recognized by most people; and I believe Mr. Holyoake himself will be bound to admit it, when he examines more carefully his own actions. But, if not, why does he then believe that people can possibly be "*wrong*" in what they do? For you will remember that he talked of people doing wrong, and of things being so awry in the world, that he even made that his ground for not believing there is a God! Mr. Holyoake also maintained that the only revelations he could acknowledge were education and knowledge. Now, no doubt, the "knowledge of the truth" is one of the greatest means of converting and elevating mankind, and, in short, it makes the great difference between the Christian and the heathen world. The inequalities in man's condition are greatly produced by degrees of ignorance, and, of course, through the freedom of man's will. This is discussed in Plato's "Dialogues"; and, no doubt, nine-tenths of the evils in the world arise from ignorance. When you get rid of the knowledge of Deity, and so of true morality (as Dr. Irons and Dr. Rigg have both said), your ignorance becomes of the densest and deadliest kind; but Christianity comes, both to raise the standard of purity and to give men the power to do good, with the promise of pardon after they have done wrong. The great gospel message is, that if you will only admit that you have done that which is wrong and do better, there is the remedy provided by God; so that men are without excuse if they do not acknowledge their faults and accept that remedy. In that case th sin must lie at our own door; and I cannot see how a responsible rational being, in a Christian land, and knowing all this, can hold himself irresponsible, if he rejects the teaching of that revelation of what is good

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and true, and if he will persist in either denying that it is the truth, or in refusing to obey it——

Mr. Holyoake.—Have I a right of reply, seeing that this gentleman has been attacking me throughout?

Mr. Reddie.—Allow me to say that all my remarks have been made in the kindest spirit. I think Mr. Holyoake misapprehends my position in discussing this Paper. I am not here to raise any personal argument, or even to discuss the whole question of the existence of God to-night, though necessarily what has been said by Mr. Holyoake has impressed me very profoundly, and called for some notice. At the same time I am bound in honour and honesty to confess, that I do not coincide with Dr. Rigg, as to there being any difficulty (even without revelation), in perceiving the necessary existence of a Creator. (Hear, hear.)

The Chairman.—We must observe some rules in conducting these discussions. I am quite willing to hear anything Mr. Holyoake may have to say in explanation; but I thought he had expressed his views and closed all he had to say; and any person who does that, is liable to hear his views commented on fairly by others who speak after him. But if we were in these debates to allow people to reply again and again to each other, I do not know when our discussions would come to an end. If there is any point on which Mr. Holyoake has been misapprehended by any speaker, he has a right of explanation, so far as he conceives he has been misapprehended; but I cannot go further and allow him to reply to the arguments which have been used in answer to him. Now, as I am fully in accordance with Dr. Irons on his Paper, I feel that I have nothing I care to say myself in this discussion, and as the hour is late, I shall therefore call on Dr. Irons to reply; at the same time only saying for myself, that I am exceedingly obliged to Mr. Holyoake for coming here and stating his opinions so frankly and fairly. It is this kind of discussion which we invite; and I can only express my individual thanks, and I am sure others will share my feelings (hear, hear,) for the candid and straightforward way in which Mr. Holyoake has stated his difficulties, however much we may differ from him. I am only sorry, if there are other gentlemen present who also feel difficulties, that the time does not now admit of our hearing them. I hoped some of them would have risen immediately after Mr. Holyoake. I am now, however, compelled to give Dr. Irons the right of reply.

Dr. Irons.—I will gladly waive my right of reply, if any gentleman, in the honesty of his heart, has anything to say like Mr. Holyoake. I am here simply in the interest of truth, and if I have said anything inaccurate, I shall be the debtor of the man who will point it out, and I will be content to leave the truth to stand on its own basis.—As no one rises, however, I will occupy your time for a few minutes. I am glad that almost all who composed this meeting have been good enough to remain to the close; but it is so late, and I have already taken up such a large portion of your time, that it would be unreasonable in me to trespass upon you at any length now. With regard to what has fallen from Mr. Holyoake, he will perceive the

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difficulty I have in commenting upon his remarks, from the fact that he has not examined my first papers, and the grounds of my whole argument. He only came in at the close ; but I believe from the few remarks which I heard him make, that he would be able to do justice to my argument as a whole. I would ask him and others present—Mr. Herbert Spencer, or any other gentleman capable of thinking and reasoning well—I would ask them in the interest of truth to read these papers when complete, and to examine them as carefully and rigidly as they would go through any proposition of Euclid ; and if they find anything that is a bare gratuitous assumption, I should like them to tell me of it. If I have assumed anything they must not grant, I will withdraw it at once. They cannot think that any human being has an interest ultimately in a lie. If these papers, written in substance seventeen years ago, and which I have hitherto kept back, intending to have them published after my death—if these papers, the anxious result of much thought and care, are untrue, let them perish ! I should not care for them. I care only for truth. But I do know, as surely as I know I am standing here, that a reasonable being whose mind is constructed in the ordinary way, and who will read these papers from beginning to end, must come to the conclusion at which they arrive, and therefore I feel, with the greatest possible thankfulness, after Mr. Holyoake's avowals to-night, that such a man will not be allowed to remain where he now is. (Hear, hear.) I have nothing to say to those specific difficulties which he has referred to, except the very reverse of what our kind friend Dr. Rigg has said. I do not at all believe that my intellect and moral convictions have the least antagonism,—not the least. I am a unit—an individual. I could not go on unless my reason and my conscience went together. It would be a long matter and would require many papers to go into all these things, but if it is the wish of the Council of this Association that I should at a future time apply the principles laid down here—the fundamental deontology—to any department of Christian theology so-called, I will do it logically and strictly, or I will give up my theology. But I would ask whether this is the place in which to hold a theological discussion ?——

Mr. Reddie.—No, it is not ; but will you be good enough to explain wherein you consider Dr. Rigg's argument so adverse to your own ?

Dr. Irons.— It was a bad argument which he used, that his intellectual convictions were on one side, and that he might say, with Mr. Holyoake and others, that faith in God came in collision with his moral inward convictions. That is what I understood him to say——

The Chairman.—I did not understand him in that sense.

Mr. Reddie.—He only meant that there were great difficulties on both sides.

Dr. Irons.—Every man acknowledges that there is something Higher than himself ; and the existence of a Divine Supreme Governor entirely corresponds with all that our inmost moral nature bears testimony to. There was one remark made by Mr. Manners, which had a sort of connection in my own mind with Mr. Holyoake's difficulties. Mr. Manners spoke of the fall of man, and the fact of our not being in our original condition, as interfering

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with the argument from reason which I had put forward. But if he thinks so, he denies man's responsibility so far as man is a fallen being. For my own part, I cannot admit that the fall makes the least difference in this question. I have not entered upon any technical theology in my argument. I have simply addressed it to the natural reason of human beings. If a man tells me I am a fallen being, he is saying no more than that I am not so perfect as I might be ; but that does not exonerate me from the grave duty of using my powers to the best. I must do it, otherwise I feel that I have a sense of guilt—that I have not done what I ought to have done. In human beings there are the greatest diversities of powers and circumstances, and one chapter in my paper is devoted to these diversities. But after all, responsibility holds on, notwithstanding that diversity ; and I think that any one who considers what I have said, and compares it with the facts of human nature, will agree with me that the doctrine of a universal fall does not alter the case any more than the fact of the great diversities of moral power in individuals. The one question with which my Paper opens—the only assumption I make is, that here we are, and that somehow or other everybody holds himself more or less responsible, and to some extent the subject of praise and blame, even to his fellow-man, as Mr. Holyoake himself puts it. But that is not all. I have taken that very position of Mr. Holyoake's as to man being responsible to his fellow-man. That is one of the facts I began with, and which we cannot escape from. We could not get on by denying a fact like that. No man could succeed in business ; you would not trust a servant if he entirely denied his responsibility and his accountability to you and to every one else. A man who acted on that hypothesis could not be trusted. All I insist upon is a fact of human nature, that every one does hold everybody else's accountability, more or less, within certain limits ; and I make every allowance for great diversities, even in responsibility——

Mr. Reddie.—But that accountability presumes the freedom of will which Mr. Holyoake denies. You clearly and properly admit this in §§ 123, 124.

Dr. Irons.—But I do not unfairly assume freedom : Mr. Holyoake will see that. I would ask any one to go through the paper carefully, and point out where any unfair assumptions are. It is either a gross imposture that has deluded my mind for seventeen years, or else it is so absolutely true that you might just as truly put Q. E. D. at the end of it as at the end of the first proposition in Euclid. If I have been in error, expose it, and I will thank you, because you will have shown me my delusion, and you are my friend. But if it be true, I am your friend. I have now only to thank you very much for the kind patience you have extended to me.

Rev. C. A. Row.—I think Dr. Rigg asserted that Dr. Irons had assumed the principle of causation. I think, however, that he has made a mistake there, for I read all these papers with the greatest care, and I have not come to that conclusion, but the contrary. But I did come to the conclusion that he assumed responsibility as a fact, on the testimony of my own mind, and the universal testimony contained in language as the voice of universal man.

Dr. Irons.—You are entirely right. I have already stated that I assumed

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nothing except what no one would dispute: first, that we are, and every one's reason will grant that; and next, that everybody praises and blames *de facto*, rightly or wrongly. Those are my only assumptions; and from those two assumptions I educed the whole of the foundations on which I believe the essentials of religion must depend. I have not gone into minor details of the Christian system, though I have glanced at them in the last two pages of to-night's paper; but I have distinctly addressed those pages *ad fideles*, because I did not connect them with the main argument, and it was scarcely to be expected that Dr. Rigg would have fastened on this post-script and left the main argument alone altogether. The whole of his argument referred to my last two pages, *ad fideles*——

Mr. Reddie.—When Dr. Rigg's speech is before you, I am certain you will not find it to be as you suppose.

Dr. Irons.—I wholly deny that there is any contradiction between the intellect and the moral nature——

Mr. Row.—I understood Dr. Rigg to say that Dr. Irons had been obliged to fall back on the idea of causation.

Mr. Reddie.—Not quite that, but only that the essential principle of causation was involved in Dr. Irons's argument along with that of man's free-agency.

Dr. Irons.—I only deny that I assumed it. It came out really as a consequence of my assumption of the fact of praise and blame, and that is a fact within everybody's knowledge and experience which is not and cannot be denied. (Hear, hear.)

The Meeting was then adjourned.

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ORDINARY MEETING, June 21st, 1869.

The Rev. Walter Mitchell, M.A., Vice-President, in the Chair.

The Minutes of last meeting were read and approved, and the election of the following Members announced :—

Members :—Rev. James M'Cann, D.D., Glasgow ; Rev. E. E. Jenkins, M.A., Brixton ; T. W. Masterman, Esq., Hare Hatch, near Twyford.

Also the presentation of the following books :—

Ancient Pillar Stones of Scotland. By Dr. George Moore. *From the Author.*
Anti-Secularist Lectures. By Rev. Dr. M'Cann. *From the Author.*
Proceedings of Royal Instit. of Gr. Brit. No. 49. *From the Council, R. I.*

The following Paper was then read by the Author :—

ON CURRENT PHYSICAL ASTRONOMY. By James Reddie, Esq., *Hon. Mem. Dial. Soc., Edin. Univer.*, Honorary Secretary, *Vict. Inst.*

ALTHOUGH the subject of this paper is so extensive, that I can ill spare any of the time at my disposal for its consideration, I must still, on the present occasion, beg leave to occupy a few minutes with some introductory words of apology and explanation. I need scarcely say, considering my connection with the Victoria Institute, that I am the last person to think it necessary that any apology should be required, as a rule, for examining with the utmost freedom, whether to confirm or confute, any scientific theory or dogma whatever which may have obtained currency among us. But a dear-bought and bitter experience has taught me, that to this rule of freedom there is one exception at least; for I know that the great hypothesis and subordinate theories I am about to examine and handle quite freely, are regarded almost as sacred and as standing on holy ground, and that I approach them at my peril,—well aware that there is an almost universal consent of prejudice against me, which is supposed to be fully justified by the certainty of scientific and mathematical demonstration, confirmed by subsequent experience and what Bacon calls "the decision of time."

2. For more now than a quarter of a century, I have

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known practically what it is to be "a scientific heretic," and how it fares with any who will venture to throw doubt upon the truth of Universal Gravitation, or to question what is supposed to be proved in the *Principia*. So far back as 1842, when I had gone but partially into the whole subject, and knew not what scientific prejudice was; when I fancied that all men of science were lovers of truth, and all able to justify their beliefs; I ventured to send two brief papers to the Royal Societies of London and Edinburgh, containing objections to the demonstrations of the first and second propositions of the *Principia*. That sent to the London Society was never acknowledged; the other was returned from Edinburgh at the end of six months as "not suitable for being read before the Society," with a civil apology for the tardiness of this reply. After an interval of twenty years, early in 1862, I published a small book on the subject,* including those objections elaborated, along with many others, and with counter-demonstrations; and in the same year I ventured to submit a Paper† to Section A of the British Association for the Advancement of Science, when it met at Cambridge, which was "declined with thanks," because Newton's theory was attacked in it. In 1863, I sent another Paper to Section A of the British Association at Newcastle, which was not even acknowledged, and which I afterwards published.‡ And lastly, the following year I tried in vain at Bath to obtain a hearing before the British Association for another Paper, which has remained till now in MS., and which was for some time in the hands of our Vice-President, Mr. Mitchell. The Cambridge paper alone was directly an attack upon the reasoning in the first section, and the demonstration of the first proposition of the second section, of the *Principia;* the Newcastle paper was chiefly an exposure of the astronomical contradictions arising from the first Herschel's theory of solar motion in space, a conception with which neither Copernicus nor Newton had anything whatever to do; and the Bath paper was on the motion of the moon, to show that its actual path and the physical laws that must regulate its motion, according to the Copernico-Newtonian hypothesis, are totally different from the hypothetical suppositions employed in solving the famous mathematical problem of the three bodies, in which—strange as it may appear—not only is the sun, but also the earth, regarded as at rest, with the moon revolving round it in an

* *Vis Inertiæ Victa; or, Fallacies affecting Science.* (Lond., Hardwicke.)

† Afterwards published with the title—*The Mechanics of the Heavens.*

‡ With the title, *Victoria Toto Cælo; or, Modern Astronomy Recast.*

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ellipse at the comparatively slow rate of about 2,000 miles an hour, instead of with a velocity of upwards of 65,000, as it flies along with the earth, describing a wave line upon *its* orbit.

3. Allow me only further to premise that some of the scientific critics of the press have professed to join issue with me upon this subject. Mr. Augustus De Morgan, late Professor of Mathematics in University College, London, in the *Athenæum*, has magnanimously misrepresented and attempted to ridicule me more than once. Mr. Balfour Stewart, anonymously, in the *Edinburgh Philosophical Journal* (which shortly afterwards became defunct), was quite as successful in misrepresenting me, and nearly as facetious, as Professor De Morgan himself. While in the late journal, *The Parthenon*, when edited by Mr. C. W. Goodwin, the author of the essay on "The Mosaic Cosmogony" in *Essays and Reviews*, there is a kind of acknowledgment that my objections to Newton's demonstrations were valid; for it is mildly observed that "there appears to be a class of writers who imagine that, if they can point out a difficulty in Newton's demonstrations, they have struck a heavy blow at universal gravitation." To which I replied, in my Cambridge Paper, "that it must depend upon the nature of the difficulties, and the demonstrations in which they are found, whether they deal a fatal blow to the theory or not; and that the proper course surely is manfully to face admitted difficulties, and clear them away, if possible, by showing that they do not, *if they do not*, affect demonstrations essential to the theory." * But the writer in *The Parthenon* almost deprecated such inquiry as unnecessary, and somewhat pathetically observed, that, "whatever uncertainty there may be with regard to some other sciences, we are usually taught to believe that the mechanics of the heavens are not uncertain." † We know, too, how implicitly Mr. Goodwin believed in the certainty of the nebular theory of the famous author of the *Mécanique Céleste*, with all its *quasi*-mathematical demonstrations, and how utterly the theory has perished. Strangely enough, a reverend Professor, who gave himself out as an adherent of that evaporated theory in the *Replies to Essays and Reviews*, wrote to one of the foundation members of this Institute, and made it a kind of objection to his not joining it, that the Honorary Secretary "actually did not believe in the theory of universal gravitation"! One of the smart writers, also, in the *Saturday Review* (which professes to be a "journal of science," though it has long since ceased to give anything like scientific articles), in noticing this Society's proceedings, has had his little joke about the author of *Vis Inertiæ Victa*. And I notice

* *Mech. of the Heavens*, § 24. † Ibid., § 16.

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these things at the outset, that you may know that I am fully aware of the odium it is possible that even yet may be attempted to be cast upon me for daring to bring this subject before you.

4. I am deeply grateful, under these circumstances, that the Council of this Society has allowed me to read a Paper on this subject. Here, as every author that comes before us knows (and some have felt it very deeply), we are perfectly free and unsparing in our criticisms. But I court, and have always courted, the most unsparing criticism; and I may here repeat what I said in my paper written for the British Association at Cambridge—namely, that "throughout this paper I shall endeavour to use the plainest and most definite language —not arrogantly, but earnestly—and, as it were, to court refutation, if refutation of what is advanced be possible."

5. Only one word more of preface. Fortunately, as regards this subject, no *odium theologicum* need be evolved. Whatever it may once have been, astronomy has long been out of the category of sciences whose teaching is supposed to be contrary to Scripture. The piety of Newton himself, and of many of his most eminent followers, has served to give almost a religious character to his great theory, which is often even used in the pulpit to lead men's minds "from nature up to nature's God"; and, in point of fact, religious objections have actually been urged against my attempt to prove that the theory is untenable! At the same time I am bound to observe, as one who has watched philosophical opinions very narrowly for the last eight-and-twenty years, with my convictions as to this subject always in my mind, that I know of nothing besides in science which so completely buoys up the atheistic and infidel classes of thinkers and public writers, in their almost stolid worship of human science and pride in man's intellectual power, as the faith that they all have, and mostly without the least pretence even of personal knowledge, in the certainty of the demonstrations of the *Principia* of Newton, and of the *Mécanique Céleste* of Laplace. M. Comte has gone so far as to say, with a shocking impiety, that "the heavens declare *not* the glory of God, but of Copernicus, Newton, and Laplace"; while Mr. Darwin, and Professors Huxley and Tyndall, in their writings, though on very different subjects, all glance back, as to a kind of foundation upon which they can lean with confidence, to the astronomical theory which forms the basis of Newton's *Principia*.

6. Having thus cleared the ground, it may be a relief to many, though it may startle most of my hearers, if I now, in the first place, observe that the "Current Physical Astronomy" of the day, as, for instance, we find it taught in the Astronomer

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Royal's Lectures, and as accepted in the Royal Astronomical Society, is not actually in accordance with anything that purports to be demonstrated in Newton's *Principia!* Let me not be misunderstood. I am not saying that our modern astronomers do not profess to believe in Kepler's laws and in Newton's theory and demonstrations. But I do say, that whatever they may vaguely and inconsistently profess, they do not hold Newton's conclusions, and that the conclusions he has professed to establish are not in accordance with what is now believed. And yet I am bound to add further, however paradoxical it may sound, that Newton is in a certain sense responsible for even what the moderns believe, though discordant with his professed demonstrations, and not in accordance with what either he himself or Copernicus or Kepler believed.

7. Let me now endeavour to reconcile and explain these apparently conflicting assertions. In the first place, we are all accustomed vaguely to speak of our believing in the truth of the Copernican system of astronomy as opposed to the Ptolemaic; but we do not literally believe what Copernicus taught, namely, that the sun is at rest in space, and that the orbits of the earth and planets round the sun are circular. Then, again, we still talk of believing in the truth of Kepler's laws of the elliptical orbits of the earth and planets round the sun; but Kepler, too, believed the sun to be at rest, though not in the precise centre of the planetary orbits. And yet we ought to remember that an ellipse as well as a circle is a curve that returns into itself, and that no ellipsis can possibly be described round a moving centre or focus that is travelling rapidly onwards in space; but this, according to Professor Airy, is now believed, as regards our sun, "by every astronomer who has examined the question carefully."*

8. Once more. Sir Isaac Newton, in the *Principia*, professes to establish upon a mathematical basis what Kepler taught were the motions of the heavenly bodies, superadding a physical cause or law to account for those motions after they have once been set agoing. That law, as is well known, was gravitation. The theory of universal gravitation (as I have already stated in this Institute) was previously propounded by Halley and Hook to the Royal Society of London, ten and twelve years before the *Principia* was published.† How the original conception of the theory came to be assigned to Newton, and the mythical story of his apple to be invented, I do not know;

* Airy's *Lects. on Astron.* (4th edit.), p. 173.

† Vide *Journ. of Trans. of Vict. Institute*, vol. i. pp. 413, 414; and *Phil. Trans.* there cited, vol. ii. pp. 126, 127, and 326. (Lond. 1809.)

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and how honest persons, if well instructed, can repeat the story, I do not understand. I can only once more point to the printed *Transactions* of the Royal Society to prove that it is a myth. All that Newton had to do with the theory was to give it mathematical countenance, and (as is popularly believed) to demonstrate its truth. But even if Newton had proved —which I beg leave to deny—that gravitating bodies could revolve in circles or ellipses round their centres of attraction, he must surely have done so in vain, if the real motions of the planets are now held to be neither the one nor the other; and, if the sun moves onwards in space, it is simply impossible that they can be so. But Newton, also, like Kepler and Copernicus, held the sun to be at rest; the primary hypothesis of the Third Book of the *Principia* being, "That the centre of the system of the world is immovable."

9. Again, all the demonstrations in the *Principia* are based upon the supposition that the heavenly bodies are moving *in vacuo*, or "in spaces void of resistance"; whereas, at the first meeting of the British Association for the Advancement of Science, it will be found that Professor Airy, the present Astronomer Royal, in his *Report on Astronomy* (1832) stated that "the existence of a resisting medium has been once more established in this century by Encke." So here, again, modern astronomers do not believe what Newton taught in the *Principia*. I may observe, in passing, that when Newton wrote, the notion of a resisting medium, or of what was called a *plenum* throughout the universe, as formerly taught by Aristotle, was then in vogue, and was the foundation of Des Cartes' system of vortices; and there is a curious letter from Voltaire to a friend, written when he came to England to visit Newton, in which he says, in allusion to this change of theories from the *plenum* to a *vacuum*, (now again reversed in our day!) "I left the world *full* in Paris, but found it *empty* in London. In France the earth is believed to be shaped like a melon [referring to the lemon-shaped water-melon, no doubt], but here it is flat like an orange."

10. So, then, if there be really solar motion in space, and if there be a resisting medium, through which all the heavenly bodies must move, there is not a single demonstration in the *Principia*, whether sound or fallacious, which is in accordance with our "Current Physical Astronomy"; and no conclusion at which Newton arrived by "demonstration" in his "immortal work" is now really accepted by modern astronomers.

11. But I have said (§ 6) that, nevertheless, Newton is in a sense responsible for even what the moderns now believe in physical astronomy, though discordant with his professed demonstrations. And here I must first beg your attention to

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what these demonstrations purport to prove, and what they do not.

12. In order to establish the probability of the theory of universal gravitation, it must be perfectly obvious to any thinking person, that the first thing to be done was to prove that a gravitating body could possibly revolve round a centre of attraction. Now, there is no attempt whatever to prove this mathematically in the *Principia*.* The theory merely rests upon some vague reasoning in the first section, under the definition of a centripetal force, founded upon the inapplicable illustration of a ball held mechanically by a string and swung round; to which we shall hereafter revert. In the first proposition of the second section it is simply assumed that gravitating bodies could revolve; and the demonstration purports to prove, by a certain mode of measuring the areas of a polygonal figure, described by radii drawn to a fixed point at intervals, that such bodies will describe equal areas in equal times: in other words, the first proposition of the *Principia* purports to demonstrate that revolving bodies gravitating to a centre (for that is meant) will move in accordance with Kepler's second law, and describe by their *radii vectores* equal areas in equal times. The two "forces" employed to produce this motion are a so-called centripetal force, intended to represent the constant force of gravity, and the innate force ("*vis insita*") with which a body perseveres in its state of uniform motion in a right line, according to the first law of motion.

13. But in this proposition the "revolving body" is supposed to move in free space, "void of resistance," and the areas are described "in one immovable plane;" and it is to these two points I now especially desire to direct attention. In the first four corollaries, also, that follow the "demonstration," the same supposition, that the bodies are moving "in spaces void of resistance," is logically and expressly repeated; and this is necessarily implied in the two additional corollaries. But in the last of these it is said—"6. The same things hold good when the planes in which the bodies are moved, together with the centres of force, which are placed in those planes, are not at rest, but move uniformly in a right line."

14. This is indeed an astounding corollary; and I need scarcely say that it is not supported by any attempt at demonstration. Yet what it thus illogically, and, I venture quite plainly to say, falsely and absurdly asserts, is coolly introduced into the second proposition, which is simply the converse of the first *with that addition*. There is no fresh demonstration

* Nor elsewhere. Vide *Mech. of the Heavens*, § 29.

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of the second theorem, which merely reasons backwards on the first, purporting to show that when the *radius vector* of a revolving body describes equal areas in equal times, it is moved by a centripetal force; and the conclusion drawn (from the same polygonal figure) is that "it"—the so-called centripetal force—"acts, therefore, always in the direction of lines tending to the *immovable* point S.—Q. E. D." And then we have, instead of any demonstration, merely this astounding assertion :—

"Case 2.—And it is indifferent whether the surface in which a body describes a curvilinear figure is quiescent, or moves together with the body, with the figure described, and its point S, uniformly in a right line."

15. I crave leave to observe with reference to this, and I do so without meaning to sneer, that it is a too simply mathematical view of the case! The atom of truth in it amounts to no more than this, that *if* the relative motions continued the same, whether the centre was in motion or not, it would not signify! Or this, that if we draw some circles on a sheet of paper to represent the orbits of revolving bodies, it is indifferent whether we carry the sheet of paper while we walk about peripatetically, or study it while quiescent on our desk, for the figures will still remain the same! But as a dynamical or physical proposition it is ridiculously absurd. For, what does it amount to? In the case of our earth it would amount to this. If the earth's orbital motion round the sun is (as we have been taught since September, 1863,) 65,000 miles an hour, the sun being regarded at rest, and if the sun's attraction serves to hold it in its orbit while travelling with that velocity (only varying a few thousand miles an hour when in aphelion and perihelion); then we are to believe that it would be "indifferent," if we were to start the sun off in a right line at the rate of 65,000 miles an hour; and that is a slow rate compared with that which some astronomers have assigned to the sun, for Bessel considered its motion two or three times as great, and Professor Airy's predecessor, Mr. Pond, assigned to it a velocity equal to that of light. Now, if the sun travelled onwards in space at the rate of only 65,000 miles an hour, and the earth kept revolving round it, what would then the motion of the earth necessarily be? Once every six months its motion would be at the rate of 130,000 miles an hour,—and how people can even conceive the sun's attraction could then hold it, I know not!—while every six months afterwards it would for a moment actually come to a dead stop; and yet then, instead of falling into the sun by its gravity, we must suppose it would suddenly hop off again to career wildly round the sun as before; its motion on this sup-

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position of solar motion, being precisely and necessarily in a cycloid curve, like that described by a nail in the rim of a wheel as it rolls along the ground! And yet if solar motion in space be true, the earth and planets must all move in curves more or less cycloidal, and all of them always with velocities *plus* and *minus* that of the velocity of the sun in the course of each revolution they make. Such is the incontrovertible result of some of the teachings of current physical astronomy, as it is now to be found in all our orthodox books on astronomy, ever since the first Herschel's time. But it is what rational men will be unable to believe, whenever they come to think. It is utterly inconsistent with all Newton's "demonstrations," such as they are; and yet it has its foundation on the illogical so-called "6th Corollary" to the first proposition of the *Principia*.

16. Following the second proposition of the *Principia*, and the scholium thereon, we have another somewhat extraordinary corollary. It contains one of the rare allusions to be found in the *Principia* to the possible existence of a resisting medium in space as affecting the motions of the heavenly bodies; * and is as follows:—

"Cor. 2. And, even in resisting mediums, if the description of areas is accelerated, the directions of the forces deviate from the concourse of the radii towards the part to which the motion tends."

I have already elsewhere noticed this obscure corollary; † and I only allude to it here to observe that it was scarcely to be expected that Newton would give much attention to the influence of a resisting medium as affecting his theory, (since, as a matter of fact, all his demonstrations are based upon the supposition that the heavenly bodies move in empty space,) and to point out the illogical character of a corollary which supposes the direct contrary. But Newton having drawn such a corollary, we need not be surprised, perhaps, that the re-establishment of the *plenum* by Encke has not disturbed the faith of Newton's followers in his "demonstrations," though they relate only to the motions of bodies *in vacuo*.

17. Before proceeding with further remarks upon current physical astronomy as it clashes with the teachings of the *Principia*, I would beg leave to call attention to some other popular astronomical dogmas. For instance, whenever we now look up to the heavens at night, "to consider the moon

* Compare *Prin.*, b. ii., prop. 53, th. 41, *Scholium.*

† *Vict. Toto Cœlo*, § 24.

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and the stars which God hath ordained," we cannot but think of what we have been taught to believe respecting their light, and their distances from "this spot of earth" on which we stand. And, first, let us give our attention to what our modern astronomers have taught us respecting what are called the "fixed stars."

18. The fixed stars are supposed to be suns, like our own sun, and to be the centres of systems, like what is called our "solar system." They are distinguished by their twinkling from the planets, which shine with a steady light; and in the field of the most powerful telescope they present no real measurable disc, however brilliant (which the planets do), but appear only as illuminated points of greater or less brilliancy. Their brilliancy is, as a rule, considered the criterion of their nearness to the earth; and they are divided into stars of the first, second, third, or fourth "magnitude," and so on, according to their decreasing brightness; but this really means (according to the current theory) that they are regarded as stars at greater and still greater distances from the earth; and these distances, I need only add, are enormous. The exceptions to this general rule are so rare, as not to require to be further noticed in a paper like the present. This theory, that the decreasing brightness of the fixed stars indicates increasing distance, involves "the probable supposition that they would all yield the same quantity of light at the same distance;"* and this really means that they are all of the same size, and that they vary in brilliancy merely as they vary in distance from us. By this method of computation *Sirius*, the nearest fixed star, is supposed to be about 140,000 times † more distant than the sun, or, in round numbers, to be about 140 thousand times 91 millions of miles distant from the earth! Taking the distance of the earth to the sun (91 millions of miles) as unity, therefore, the distance of *Sirius* is as 140,000 to 1; and the distance of the bright star, *a Lyræ*, is as 800,000 to 1; *i. e.*, it is distant from us 800 thousand times 91 millions of miles! I need scarcely say that the human mind can really form no distinct conception whatever of such figures!

19. Another mode of astounding our conceptions as to the imagined distances of the fixed stars, according to current theories, is by estimating the time their light would take to reach this earth. On this point I need only say that, according to the computations of Struve and Peters, it was inferred the light of stars of the second magnitude would take twenty-

* Grant, *Hist. of Phys. Ast.*, p. 542. † *Ibid.*, pp. 546, 547.

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eight years to reach us,* light being then supposed to travel at the rate of 192,000† miles per second; also that the light from the smallest stars visible to the naked eye could not have reached the earth in less than 138 years; while the light from the smallest stars visible in Herschel's 20-feet reflecting telescope must have occupied 3,541 years in reaching the earth.‡ These few figures are more than enough for my present purpose, which is utterly to discredit this notion, and all that has been deduced from it, as *ab initio* and altogether absurd. It is part of this teaching that stars of the second magnitude, that is, stars only less bright than *Sirius*, must have been shining in the firmament for twenty-eight years before they were visible on the earth; and that the smallest stars visible to the naked eye must have been invisible for 138 years. The converse absurdity (as I will venture here to call it) has also been taught, that if such stars ceased to exist, they would continue as visible stars, to earthly eyes and telescopes, for 28 years and 138 years respectively after their non-existence! It has also been gravely put forward that there may be stars so distant that their light has not yet reached the earth, though it will yet do so; and again, with converse absurdity, that stars may be visible in our telescopes, as apparently existing visible stars, thousands of years after they have ceased to exist! To enable you the better to realize the absurdity of this, I may observe that it implies that the stars forming the Milky Way, as seen by us every night, and by Hipparchus and Ptolemy 2,000 years ago, might have been equally visible, though they had ceased to exist hundreds or thousands of years before! It also implies that the twinkling of the stars, and the changes in their brilliant prismatic hues, that we gaze on with admiration any evening, are twinklings and changes that occurred many years before, and not at the moment we see them! Whether upon Newton's now abandoned corpuscular theory, or the modern undulatory theory of the transmission of light, I can only characterize all this as absurd; and (granting either theory to be true, though I believe in neither,) as being a confounding of the supposed motion of light with our mode of seeing objects. It is, I consider, refuted every evening as the stars rise and set, and indeed every time we shut and open our eyes to look upon them. We see dark objects, as well as those that are bright and which are said to "emit light," the moment they are exhibited to us, if

* Grant, p. 553.

† Now reduced to 183,470 miles per second.—*Vide* Reddie's *Current Phys. Ast.*, book iii. p. 48. (Hardwicke.) ‡ Grant, p. 553.

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within the range of our vision,—or, in the expressive phrase, "in the twinkling of an eye;" and they must disappear as objects (whatever brief impression may remain on the retina of the eye), whenever they are removed from the range of our vision, or cease to exist; and, however bright they may have been with the effulgence of light, they could not possibly be seen as objects even half a minute after they ceased to exist.

20. Nay, I will venture to go one step further and ask,—But what if light is instantaneous in what is called its "transmission"? I will also add that I believe it to be so; and further that there needs no corpuscular emanation of light in order that we may see it, neither any undulation of an imagined ether; but that the moment light is, it is seen, just as instantaneously as it was "in the beginning," when "God said, Let there be light and there was light"! For, let me ask, what difference is there, or can there possibly be, in the very least, between the "transmission" of light and of darkness? Even this absurd notion that stars might remain visible as stars for years after ceasing to exist, implies merely that the blanks or dark spaces produced by the non-existence of the extinct stars, would only become perceptible to us in the same time that their light had taken to travel to us when they were formerly created! But how do we see a dark object at all? Surely there is no light to be transmitted or waved in undulations from it; and yet we do see it; and I venture to say instantaneously, the moment it comes within the range of our vision, and as quickly, if seen at all, whether at a great distance or nearer. But, in short, for I must not travel into optics, nor pursue this important and interesting subject further here, I venture to say that when we see the sun, and the dark spots upon the sun, we see them together, just as they are, and at the very time they come within the range of our eyesight or glasses (though I am not overlooking nor denying the effect of atmosphere, any more than of defective eyes or object-glasses); and so, we may be sure that the stars in the heavens, as catalogued by Hipparchus and still visible to us, are actually and most certainly existing as we gaze upon them, and also that the few occasionally variable stars do vary in their brilliancy at the very time when they appear to us to do so. In fact, I allege that there never were any optical illusions in nature so astounding and incredible, as those which have been invented and palmed off upon mankind in modern days as deductions from our current physical astronomy.

21. The origin of this notion, I must briefly observe, is based upon the theory of the velocity of light, calculated upon the

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difference in the computed time for the occultation of *Jupiter's* satellites when that planet is nearest and when it is most distant from the earth. And when the earth's distance from the sun was regarded as 95 millions of miles, the velocity of light so calculated was regarded as 192,000 miles per second, but has since been reduced by 8,000 miles per second, or to 183,470 miles, when the earth's distance from the sun was reduced six years ago to 91 million miles.* I must refer to what I have pointed out elsewhere as to the supposed experimental verifications of each of these astronomical rates, by Helmholtz and Foucault respectively, with an accuracy in the former instance, it was said, "to the 77-millionth part of a second!" † And I only allude to this here that it may be kept in mind that it is to our theoretical and physical Astronomy, and not to Optics, that we owe our modern teaching as to the velocity of light, as well as those curious speculations which have been based upon it relating to the fixed stars.

22. But now I must notice that our modern astronomers, having further discovered that the so-called "fixed stars" are not literally all fixed in the sense that earned them that appellation, have further illogically deduced from what is called the "proper motions" of some such stars the theory of "solar motion in space." I ought to state, however, that the notion of the fixed stars not being really fixed, or immovable with respect to each other, was actually put forward as a speculation "before the observations of astronomers acquired a sufficient degree of precision to indicate even the slightest trace of its real existence." ‡ One of the first persons to make this guess was Jordano Bruno, formerly a Dominican monk, who seems to have renounced the religious extravagances, first of Rome and then of Geneva, only to launch into other extravagant speculations of his own. But of his sincerity there can be no doubt. He was imprisoned by the Inquisition for two years, and was burnt as a heretic and an infidel in the year 1600. But Halley is said to have been the first who adopted the notion of the proper motion of the fixed stars from actual observation. § Bradley thought the apparent motions of some of the stars might arise, either from a motion of the solar system in space, or from a real change in the position of the stars themselves. Thomas Wright, of Durham (a name little known), in a book published in 1750, concluded "that the sun with its cortege of planets, as well as all the stars of the firmament, are in continual

* *Current Phys. Ast.*, b. iii., pp. 38–48. (Hardwicke.)
† *Vide* Note A. ‡ Grant, p. 553. § Ib. 554.

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motion,"* just as Bruno did. Mayer, however, in 1760, after careful observations of the proper motions of 80 stars, and comparing the observations of Roemer in 1706 with his own and Lacaille's in 1750 and 1756, came to the conclusion that the observed proper motions "of the stars did not afford evidence of motion of the solar system towards any particular region of the heavens."† But the first Herschel, in 1783, arrived at a conclusion diametrically opposed to that of Mayer;‡ and since then, till now or till very recently, our orthodox astronomers appear to have left the region of doubt upon the subject of solar motion in space, for a region of absolute and I must add of blind unreasoning faith in its certainty.

23. I have alluded (§ 2) to the Paper I sent to the British Association at Newcastle in 1863, controverting this theory. That Paper I published in September, 1863, with an appendix, in both thoroughly exhibiting the illogical reasoning and absurdities involved in the theory,—and with what result? The Members of Section A of the British Association, and Fellows of the Royal Society and of the Royal Astronomical Society, to whom I sent copies of my Paper, were, without exception, *dumb!* But I quote the following from the Annual Report of the Council of the Royal Astronomical Society, laid before the Forty-fourth Annual Meeting of the Society on the 12th of February, 1864,—the Reverend R. Main, Vice-President (the *Radcliffe Observer*), being in the chair:—

"Astronomers will regard with especial interest the Astronomer-Royal's renewed attempt to determine the magnitude and direction of the motion of the solar system in space. Sir W. Herschel, in 1783, by a graphical method of great simplicity, showed that the proper motion of a few stars might be tolerably well accounted for by assigning to the sun a motion of his own directed towards λ *Herculis*. Other astronomers, starting with this as an approximate apex of solar motion, have sought to correct it by combining together a far greater number of stars than could be taken into account by the elder Herschel. The Astronomer-Royal, by the independent method of referring all the motions to three rectangular co-ordinates, as applied to 1,167 stars, falls again very nearly upon Sir W. Herschel's original position of the solar apex. *And yet, strange to say, notwithstanding the near coincidence of all the results of the before-mentioned independent methods of investigation, the inevitable logical inference deduced by Mr. Airy is, that the whole question of solar motion in space—so far, at least, as accounting for the proper motion of the stars is concerned,—appears to remain at this moment in doubt and abeyance.*" §

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* Grant, p. 555. † Ib.; *Vide*, also, Note B. ‡ Grant, p. 555.

§ *Monthly Notices of the Roy. Ast. Soc.*, 12th Feb. 1864, vol. xxiv., No. 4, p. 104.

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Such is the testimony of Professor Airy, the Astronomer-Royal of England, in 1864, although he had, in four editions of his interesting *Six Lectures on Astronomy*, and always previously, publicly taught that solar motion in space, as deduced from the apparent proper motions of the fixed stars, was believed in "by every astronomer who has examined the question carefully."* I venture to think that, after this, I was entitled to claim, as I did in 1865, that my Newcastle Paper had "already had its triumph," † and that it had, in fact, forced Professor Airy to give up the notion of solar motion in space. When my attention was called by a Fellow of the Royal Astronomical Society to the foregoing passage in the Report of its Council, I endeavoured to make this important change of conviction on the part of the Astronomer-Royal known to the general public through *The Times* and some other of the leading daily newspapers; but in vain! And the editors have, perhaps, this excuse for their deciding to keep the public in ignorance of it, that a matter so very important ought, no doubt, to have been made publicly and generally known by the Astronomer-Royal himself, or by the Royal Astronomical Society, to whom it was first officially communicated, and by whom it was merely made known to the few persons who happen to be Fellows of the Society, or who may see their *Monthly Notices* and *Transactions*. In a letter, however, addressed to Professor Airy himself in June, 1864, relating chiefly to some other astronomical questions I claimed to have preceded him in coming to his present "logical" deduction on this point; and in replying, very courteously, to other portions of my letter, he did not gainsay that part of it.‡

24. I shall now only notice briefly two considerations, overlooked by the astronomers, that rendered the notion of solar motion in space as accounting for or deduced from the proper motion of some of the fixed stars, *ab initio* illogical and absurd. In the first place, upon the prior hypothesis that the fixed stars do not occupy the same plane or surface, but are situated at enormously varying distances behind one another in the depths of space, it ought to have been evident, that if there was solar motion onwards in space, then all the stars, and not only some of them, would necessarily vary in their relative positions, and especially all those of different magnitudes at right-angles to the direction of such solar motion; just as

* Airy's *Lects. on Ast.*, 4th ed., p. 173.

† *Current Phys. Astron. critically examined and confuted*, in three books. Introduction and Notes. (Hardwicke.)

‡ *Vide* Note C.

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when a man rides through a forest, all the trees at different distances on each side of him will necessarily appear to move relatively to one another as he advances. If, however, only one or two trees here and there appeared to move to a man in the midst of a forest, while others behind them remained stationary, the man ought to be sure of two things: first, that the apparent motion of these few trees must be more or less real; and, 2nd, that at any rate, and whatever the cause of their apparent motion might be, *he is not* moving through the forest himself.

25. But in the next place, the whole speculation and all the computations in connection with it, were further vitiated, and absurd *ab initio*, from the very calculations as to the parallax of those stars having an apparent proper motion, being made upon the self-contradictory supposition that they were viewed every six months from the ends of a base line only 190 millions of miles long,—that is, from the extreme ends of the diameter of the earth's orbit round the sun, which base was only accurate upon the hypothesis that the sun is at rest and *not* moving in space! But I cannot now spare further time to point out all the absurdities connected with this ridiculous and now abandoned theory, but must refer to what I have published elsewhere on the subject.*

26. After the fixed stars the next astronomical objects that must engage our attention are the planets, with their satellites,—including our own moon, upon the current theory which regards the earth as also a planet revolving round the sun. Considering the theory of solar motion in space as now virtually given up by the Astronomer Royal, I shall not here notice further the confusion and complications and contradictions that theory necessarily introduced into the planetary theory as believed in by Kepler and Newton, but will only refer to preceding paragraphs (§§ 7, 10, 13, 15,) of this paper, and to what I have previously written elsewhere on the subject.† But the fact is, many of the difficulties and complications which the theory of solar motion in space, if accepted, would introduce into the current planetary theories, do already exist with respect to the motions of the satellites of the various planets. And this consideration obliges me to revert to the two astounding and illogical corollaries to the first and second propositions of the *Principia* already noticed (§§ 13, 16).

27. As regards the last of these, and the restoration of the plenum, I will only further observe (*vide* § 16), that even were

* *Current Phys. Ast.*, b. iii., *in loc.*

† *Current Phys. Ast.*, § 54, *et passim*; also Append., *in loc.*

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all other objections got over, there is one which is very obvious as regards the motion of our own earth round the sun as a planet in a resisting medium (whether it applies to the other planets or not); and it is an objection which, so far as I am aware, is not only not obviated nor answered in any book on astronomy, but it is one which, like most if not all of those I have now adduced, appears never to have been once considered by astronomers, but, on the contrary, is simply and altogether ignored. And it is this:—That however easy it might be, apart from dynamical considerations, to accept the Newtonian theory of the earth and planets revolving round the sun in spaces void of resistance, it is impossible not to perceive insuperable difficulties to their doing so in a resisting medium, if, like the earth, they all have atmospheres. Getting rid of the vortices of Des Cartes, in and by which the planets were supposed to be carried round the sun in their orbits, indeed, necessitated a free space for these bodies to move in; for, however easy it may be to conceive that solid bodies might move with immense velocity through thin air or ether, and yet retain their form, this cannot be rationally imagined of bodies having circumambient atmospheres like the earth; for in a resisting medium the earth, with its air, would soon assume the form of a comet, and in revolving in its orbit would carry all its light atmosphere and floating vapours behind it. And so of all the planets, if they have vaporous atmospheres.

28. But the other corollary referred to (§ 13), is replete with still graver difficulties. It was, no doubt, introduced by Newton, who, as I have already said, knew nothing of solar motion in space, with the view of explaining or accounting for the motions of the satellites round their primary planets on his theory. The analogy between the motions of the sun and planets if the sun moved onwards in space, and the motions of any planet and its satellites round the sun, is perfect. In a letter which appeared in the *Astronomical Register* for February, 1864,* on "The Motion of the Solar System in Space," I wrote as follows:—

"Again, if the sun moves in space, the variation in the orbital velocities of all the bodies that revolve round it *must* differ, by the whole amount of the sun's motion, when at right angles to its path, twice every revolution they make. For instance, taking the sun's motion as 18,000 miles an hour, [the rate supposed by MM. Argelander, Struve, and Peters,] the earth's mean orbital velocity of 65,000 miles an hour must sometimes be 65,000+18,000=

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* London: J. D. Potter, Poultry, and King Street, Tower Hill.

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83,000 ; and six months afterwards 65,000 – 18,000 = 47,000 miles an hour only. Is this credible on physical principles? Moreover, if the sun's motion in space were 65,000 miles an hour (Bessel thought it twice or three times as great), then the earth's orbital motion once a year would momentarily cease ; as it must then describe a perfect cycloid in going round the sun. Then its velocity once a year would be 65,000 + 65,000 = 130,000 miles an hour ; and six months afterwards, 65,000 – 65,000 = 0, according to well-known mechanical principles and the necessities of the laws of space and motion. It is not so plainly obvious, but it is equally true, that if the sun's motion is only 18,000 miles an hour, the earth must yearly pause altogether for an instant, in describing the looped curve it *must* describe in going round the sun. . . . . This is a mere fact of mechanical construction ; the earth's path would be what I may call a *compressed cycloid.* But is that credible?"—(*Astronomical Register*, February, 1864, p. 38.)

29. Well, to this an "orthodox" astronomer actually ventured to reply, in the following number of the *Astronomical Register*, with the initial "D." ; and I am informed the writer is a Mr. Dell, of Aylesbury. He wrote as follows :—

"(1.) In the February number of the *Register*, there is a letter from Mr. Reddie on the subject of the Motion of the Solar System in Space, in which he asserts that there can be no such motion, because of some fanciful contradictions 'to well-known mechanical principles'!

"(2.) I presume it will be admitted that *Jupiter* with his satellites is strictly analogous to the solar system, on a small scale ; and we can therefore bring Mr. Reddie's assertion to the test of observation.

"(3.) Substituting *Jupiter* for the *Sun* in the following paragraph of the letter referred to, we shall read,—'If *Jupiter* moves in space, the variations in the orbital velocities of all the bodies that revolve about it *must* differ by the whole amount of *Jupiter's* motion, when at right angles to its path, twice in every revolution they make.' For instance, taking *Jupiter's* motion at 29,000 miles an hour, the second satellite's mean orbital velocity of 32,000 miles an hour must sometimes be 32,000 + 29,000 = 61,000, and half a revolution afterwards, 32,000 – 29,000 = 3,000 miles an hour only.

"(4.) Now when Jupiter is in opposition, these two points of maximum and minimum velocities will occur at the occultation and transit of the satellites. For instance, taking the second satellite, its velocity at its occultation should be, according to Mr. Reddie, 61,000 miles an hour, it being then moving at a right angle with the planet's path, and in the *same direction ;* while at its transit it should have a velocity of 3,000 miles an hour only, as it will be moving at a right angle to its primary's path, but in an *opposite direction.* Therefore the time occupied by the transit of the satellite should be somewhere about twenty times that occupied by the occultation.

"(5.) But according to observations at previous oppositions, and to the

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computation of the times which will be given in the pages of your *Register* for May next, both phenomena occupy a little over two hours, and differ only a few minutes ; and the accuracy of your computed times may be confirmed by future observation about 11th May, [1864,] at which time *Jupiter* will be again in opposition.

"(6.) It appears then, that Mr. Reddie must either deny *Jupiter's* orbital motion, for precisely the same reasons as led him to conclude the Sun to be motionless, or that he has misapplied the 'well-known mechanical principles and necessities of the laws of space and motion.'"

30. To this letter I replied in the April number of the *Astronomical Register,* as follows :—

"(1.) As regards paragraph one of D.'s letter, I think he must yet confess that I indulge in nothing 'fanciful.' 'The test of observation' (in par. 2) I accept. I agree with paragraphs three and four except the last two lines, in which D. draws a false conclusion from his own premises, as probably he has already discovered. But, since his argument stands on record, I must answer it.

"(2.) Suppose, therefore, the Sun to be at rest, and that *Jupiter* revolves round it, with a mean velocity of 29,000 miles an hour ; also that his second satellite revolves round him with a mean velocity of 32,000 miles an hour. Then, doubtless (according to well-known mechanical principles, and the necessities of the laws of space and motion), the satellite *must* move, when it is being eclipsed at the rate of 29,000 + 32,000 = 61,000 miles an hour *direct,* and during a transit at the rate of 29,000 − 32,000 = 3,000 miles an hour *retrograde.* So far, I beg leave to assume D. goes with me ; as I am merely quoting what he himself truly says, though he puts it forward only as an *argumentum ad hominem* against me.

"(3.) But he adds (par. 4) :—'Therefore, the time occupied by the transit of the satellite should be somewhere about twenty times that occupied by the occultation!' To this (as I have hinted) I feel it almost unnecessary to reply. D. has inadvertently overlooked the effect of *Jupiter's* own proper motion, and forgotten that *the time* of the occultation or transit only indicates the *apparent* and *relative* motions of the planet and satellite : i. e., the time in which they cross one another.

"(4.) I therefore pass over par. 5 of D.'s letter, and come to par. 6. There he says :—'It appears, then, that Mr. Reddie must either deny *Jupiter's* orbital motion, for precisely the same reasons as led him to conclude the Sun to be motionless, or [admit] that he has misapplied the well-known mechanical principles, and the necessities of the laws of space and motion.' Now, I do not take advantage of the error in reasoning already noticed, upon which the first of these alternative propositions is based ; but will frankly admit that there is a fair analogy between the solar system with a moving Sun, and the motion of *Jupiter* and his satellites. I assume, also, that D. will now give up his second proposition, taking for granted that (assuming

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his own data in par. 3) he now sees that the real motions of *Jupiter's* second satellite *must* differ precisely by 58,000 miles an hour, during an occultation and transit respectively, and that these greatly varying velocities are *confirmed* by 'the test of observation.'

"(5.) But should D. not admit these assumptions, then I would beg leave to turn his own argument against himself thus :—If *Jupiter's* real motion be 29,000 miles an hour direct, and we suppose the real motion of his second satellite during an occultation to be 32,000 miles in the same direction—then the apparent and relative velocity of the satellite (i. e. the rate at which it will pass behind the planet), will be only 3,000 miles an hour direct ; whereas, if during a transit, while *Jupiter* is moving at the rate of 29,000 miles an hour *direct*, we suppose his satellite really to move at 32,000 *retrograde*,—then (to apply the test of observation) the apparent speed with which they would cross one another would be 29,000 + 32,000 = 61,000 miles an hour ; and, in that case, the eclipse would certainly occupy twenty times the period of the transit. The latter would be over in little more than an hour, the occultation would take more than twenty hours. But 'the test of observation' refutes these absurd suppositions and their results, and proves what D. had questioned.

"(6.) The analogy adduced by D. is nothing new to me. In a Paper on this subject, which I submitted to Section A of the British Association this year, I said :—'The motion of the moon round the earth, as it moves in its orbit round the sun, is analogous to the motion of the earth round the sun, if the sun moves in space.' . . . . In my former letter, I only noticed a few very salient points, in order to induce others *to think*.

"(7.) If D. had said that such immensely varying angular velocities as those of *Jupiter's* satellites are thus shown to be, while revolving round their primary and but slightly varying their respective distances, cannot be reconciled with the current dogmas of physical astronomy, any more than the varying velocities of the earth, if the sun moved in space, to which I have objected, I could not have gainsaid the proposition. But the *facts* as to the motions of *Jupiter's* satellites being what they are,—assuming D.'s own data, and applying his own test,—I trust that he is not prepared to say, 'so much the worse for the facts,' and to cling to irreconcileable theories.

"(8.) D. should also recollect that the motions of *Jupiter* and his satellites, like those of all the other planets and satellites, and the comets, would themselves be greatly complicated and confused by the motion of the sun as their centre. Their old aphelion and perihelion velocities would all be upset if the sun so moved ; and all the elliptical orbits converted into complicated, impossible paths, that could only be characterized as *Vermicular*. For simplicity and clearness, I have chiefly argued only as to the earth and moon. To do more would be like attempting to explain the *obscurum per obscurius*. After all, we do know somewhat more of this dull earth than of *Jupiter* and his satellites. These may whirl about in looped curves, with alternate points of rest and great velocity, and yet continue, as we see they do, in the heavens. But what would happen if this massive earth were thus arrested in its orbit, or

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had its velocity reduced by 36,000* miles an hour? Moreover, *what* could so reduce its velocity; or, if reduced, cause it afterwards to increase, so as to enable it to get round the flying sun?

"(9.) In conclusion, I would beg D. and others to observe that, at last, after a life-long adherence to this ill-considered theory, the Astronomer-Royal now admits it to be fraught with doubt and uncertainty and confusion. . . . . I, too, was taught, as a child, that even the earth's whole orbit is 'only as a point,' with reference to the fixed stars; but, as a man, I don't believe it.' *Credite posteri?*"

31. These arguments, as I have said, appeared in the *Astronomical Register*, which has a considerable circulation among astronomers, but no rejoinder to my last letter appeared either from Mr. Dell or any other. In fact, the arguments are unanswerable; and, of course, it is not my duty to account for the apathy, or whatever else it may be, among professed astronomers, who must be supposed to be competent to understand the bearings of such reasoning and demonstrations upon our current physical astronomy. What is thus true of *Jupiter* and his second satellite, taking the rates of motion assigned authoritatively to each, is true *mutatis mutandis* of all the planets having satellites, and so it applies to our earth and moon. It was to the actual motion of our own satellite, according to the current theory, that I endeavoured to draw the attention of the British Association at Bath in 1864, in the Paper I have already referred to, and which I afterwards placed in our Vice-President's hands (§ 2).

32. But here I will only refer to one most important point relating to the moon's motion, as bearing upon the verification, which Newton is supposed to have obtained by means of it, of the law of universal gravitation. Now, this supposed verification was obtained by calculating the amount of the moon's fall from the tangent to her orbit in a given time. Taking the moon's orbit round the earth as circular or oval, and taking the semi-diameter of this *quasi*-orbit as equal to sixty semi-diameters of the earth (*i. e.* $60 \times 4{,}000 = 240{,}000$ miles), Newton found "that the time occupied by the moon in falling through a given space was exactly sixty times greater than that occupied by a body at the earth's surface in falling through an equal space."† And so, says Mr. Grant, in his *History of Physical Astronomy*, "it thus appeared that the force which retained the moon in her orbit, as deduced

* This would be so, if the sun's motion were at the *lowest* rate assigned to it (by Struve and others) of 18,000 miles an hour.

† Grant, pp. 24, 25.

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from her actual motion, was less than the force of gravity at the earth's surface, in the exact ratio of the inverse square of the distance from the centre of the earth." And Grant adds, in a note, "It is said that Newton became so much agitated as soon as he began to suspect the probable result of his calculation, that he was compelled to assign to a friend the task of bringing it to a conclusion." * Grant very fairly notices, that in making this calculation, "the force which retains the moon in her orbit is here supposed to act in the same direction during a very short space of time"; but he thinks "this supposition, though not strictly true, cannot sensibly affect the result." Now I beg to observe that the same fallacious supposition runs through all the demonstrations of the *Principia*, and is especially patent in the first proposition, which is demonstrated by an illogical application of the laws of the parallelogram of forces or velocities to the solution of a problem which relates to a central or centripetal force; and this, I say, does materially affect the result, and, in fact, entirely alters it.† But I pass over this objection now, because there are others which claim priority over it;—namely, that the moon has no such orbit in reality, as was assumed for the basis of the calculation, if the earth goes round the sun; that there was not any computation whatever "deduced from the moon's *actual* motion"; that there is no such fall from the tangent to her *actual* path; in short, that all that depends upon this famous "*experimentum crucis*" (as it has been called), "which was to decide whether Newton had penetrated into the secret of the celestial motions, or whether he had been occupying his mind with speculations of a purely mathematical nature," ‡ rests upon a series of false data and false suppositions, and upon consequent fallacious reasoning. This problem also, like that of "the three bodies" (§ 2), was only solved upon the false supposition that the moon has a nearly circular orbit round the earth, which could only be if the earth is at rest in space; the moon's *actual* path, *ex hypothesi*, if the earth goes round the sun, being an orbit, differing slightly from that of the earth, nearly in *a circle round the sun*. This is simply *a fact*, about which there can be no dispute among rational beings who understand the subject; and I need scarcely add that the force of gravitation, or any other force in the universe, can only produce or affect the actual motions of bodies; and the effects of such forces cannot possibly be truly measured by calculations based upon merely relative or apparent motions. This particular branch of this great subject, however, I have specially discussed in the Paper

* Grant, p. 25. † Vide *Vis Inertiæ Victa*, § ix. *passim*. ‡ Grant, p. 21

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already alluded to (§ 31), prepared for the Bath Meeting of the British Association, and rejected ;* in which I also show that if the sun does affect the moon's real motions upon the heliocentric hypothesis, its influence is *repulsive*, or the very reverse of what appears to be proved by all the fallacious demonstrations that deal with the moon's relative or apparent motions only.

33. There are still a few points connected with current physical astronomy to which I desire briefly to direct your attention. There are, especially, two dogmas of Newton's *Principia* universally accepted as true, and constantly in men's mouths, which I wish to bring before you, and ask you to consider, with the reasoning upon which they are based, in the *ipsissima verba* of Newton. One of these dogmas is embodied in what is called the Third Law of Motion, and it is as follows, viz. :—

"LAW III.—*To every action there is always opposed an equal reaction ; or, the mutual actions of two bodies upon each other are always equal, and directed to contrary parts.*"

Such is "the law," as laid down in Newton's "immortal work"!—Now, listen to the reasoning upon which this law is founded :—

"Whatever draws or presses another, is as much drawn or pressed by that other. If you press a stone with your finger, the finger is also pressed by the stone. If a horse draws a stone tied to a rope, the horse (if I may so speak) will be equally drawn back towards the stone." (*Prin.*, book i., sect. 1.)

Now, in direct opposition to this, I have already ventured to assert, and beg leave now to repeat—

"That mere matter, and therefore all material bodies, can only be truly regarded as perfectly passive, and without any tendency or inclination of their own ; and that consequently it follows that whenever a body offers resistance to any action exerted upon it, or to any force impressed against it, such resistance is not due to the matter or body itself, or to any *vis inertiæ*, but to some previously impressed force or influence affecting the body. So, when a horse draws a stone tied to a rope on level ground, the resistance the horse has to overcome is due to the weight of the stone and the friction resulting therefrom. If the stone is small and light, the resistance may be so small as to be unfelt ; or the stone may be so large and heavy, that the horse can only with the greatest difficulty move it ; or it might be so heavy, that the horse could not move it at all ; in which case there would be no friction, and

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* *Vide* Note D.

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the resistance experienced would be due to the weight of the stone exclusively. The amount of resistance, whether of weight only, or of weight and friction combined, depends on the gravity, and is only proportional to it, whatever the exertion of the horse may be. Beyond the weight and friction, there is no further resistance; and this is clearly inconsistent with the dogma that 'action and reaction are always equal and contrary.' Or, again, in pressing the hand against a stone or other rigid substance, there is no reaction whatever. According to its weight, or hardness, or strength, the substance resists. Beyond that, it yields or breaks. As long as the body resists the pressure, the resistance (*i. e.* while the body does not yield) is certainly *and therefore* greater than the pressure. As the body does not press back, but only resists, the pressure is necessarily always only equal to itself; but there is no reaction in this case, such as there would be if some elastic body were pressed in like manner." *

34. I must tell you, now, how some modern "men of science" have written upon the same subject. In the *Edinburgh New Philosophical Journal*, for April, 1864, Mr. Balfour Stewart, F.R.S. (writing anonymously), criticised my reasoning, as follows:—

"Did Mr. Reddie ever try to open a massive iron gate, or to deliver a large curling-stone? Had the weight of either body anything to do with the difficulty he experienced in handling it? Did he ever try to stop a large grindstone set in rapid rotation, or was he ever struck by a cricket-ball? We fear he has not been, or he would reverence the recollection of the *Vis Inertiæ*."

To this, of course, I could but answer:—

"That only weight in the case of the curling-stone, and weight and friction in the case of the 'massive' iron gate, could have to do with the difficulty of delivering the one, or of opening the other. And in proportion as the massiveness or weight of the stone or gate might be reduced, would the difficulty of moving them be lessened, till it might vanish altogether if the weight could vanish. The writer did not probably reflect what the word 'massive' really meant when making these interrogations. And I would suggest to him the consideration, that an empty puff-ball, almost without weight, even if thrown with the most frantic effort, will strike with no material force, and could not induce any of that 'reverence' which might doubtless follow a blow with something more substantial and solidly filled." †

35. I have, however, now to cite from a much more eminent Fellow and Vice-President of the Royal Society, namely, Mr. W. R. Grove, Q.C., who was also the President of the British Association at Nottingham in 1866; and it will, no doubt,

* Vide *Vis Inert. Victa* (in *Current Phys. Astr.*), §§ 21—26, and note.

† *Mech. of the Heav.* (*Current Phys. Astr.*), note, p. 17.

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surprise some persons to find that what I quote from him is in accordance with my own "heretical" views! Well, that distinguished scientific author, in the first edition of his celebrated work on *The Correlation of Physical Forces* (1846), thus expressed himself:—

"Inertia appears to me to be a static condition of the force of gravitation, or, in other words, resistance to motion [he means force] occasioned by the force of gravitation. *Without gravitation I cannot conceive inertia.*"

And in the second edition of the same work, published in 1850, I find the following passage:—"The phenomenal effects of gravitation and inertia, *if there be such a force as inertia*, being motion and resistance to motion," &c. But I regret to be obliged to add that I cannot trace any corresponding passages in the last edition of Mr. Grove's book, published in 1862, though I am glad to find he does not shrink from repeating in it his reasoning against Black's theory of "latent heat," and opposes the more modern notion of "invisible light," as to both of which scientific dogmas I, too, have ventured to be a thorough "heretic." Why Mr. Grove now sinks his opposition to the self-contradictory notion of "such a force as *inertia*," it is not for me to say. For myself, I continue, profanely, without the least reverence for *Vis Inertiæ*, in both senses of the latter word.

36. But more popular authors also enlighten the public with their views of Newtonian dogmas. A really brilliant writer, in an article on "Force," in the *Cornhill Magazine* for 1861, put forth the following, not, indeed (he said), as the "common-sense" view of things, but as "that which arises from the thoughtful tracing of their real connection," or the scientific view:—

"All actions in nature are two equal and opposite actions. It is a law with no exception, nor possibility of exception. Nor is any change, any seeming origination or ending of an action, rightly apprehended till it is seen thus in absolute interlinking with its fellow. We are familiar with this principle in some simple instances, but the demand is that we should be sure of it in all. The very spirit of science consists in the confidence with which it is grasped, and applied to all cases, *however vast beyond the reach of our observation, or complex beyond our power to unravel*, however long the completion of the process may be deferred."

This might well be called, in my opinion, the third law of motion travestied, or action and reaction run mad! And yet I fear this writer's views are not altogether uncommon in our day. He somehow connects this "law" with the *alternate*

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actions of vibration (with which it has nothing in the wide world to do), instead of the *simultaneous* "*reaction*" predicated by Newton of pressure, &c.; and the *Cornhill* writer sums up his article with a not illogical conclusion (partly quoted from some other author), which, if intended as science and not poetry, must have startled even some of the "scientific," as well as more ordinary students in natural philosophy. He says:—

"If all natural action is vibration, involving opposite and equal actions, then the sum of it all equals—none. These opposites are like *plus* and *minus*, and they make up 0. 'There never was a force in the universe for any one moment of action but there was another of equal force, acting in opposite direction. The sum total of all the forces in the universe is equal to—nothing;—and has been so at every moment.'"

With such ridiculous nonsense passing current amongst us as "the very spirit of science," need we be surprised that the "Positive philosophers" of our day, in like manner, profess to have found, that the great First Cause of all the Phenomena of this world is, also, only equal to 0? But to revert to *the* "action and reaction" referred to in the third law of motion, it is not unnatural to ask,—How, if every action were always opposed by *an equal reaction*, could the impression of force ever produce motion? These opposites would really be "like *plus* and *minus*"; and "all the forces in the universe would indeed be = 0"! Surely science and common sense must alike agree, that when bodies resist pressure, the degree of resistance (call it "reaction" if you please) depends upon the weight or quality of the body, and not upon the amount of pressure. When we press with the finger against marble, quicksilver, or water, with equally great force, we experience three different degrees of resistance from these three different material substances, arising from their different qualities of hardness or softness, solidity or fluidity, but having no dependence upon, nor equality with, the degree of force or pressure (or "action") exerted upon them.

37. But I must now pass on to notice, as I promised (§ 12), what appears in the 1st section of the *Principia* relating to a centripetal force:—

"Definition V.—*A centripetal force is that by which bodies are drawn or impressed, or any way tend towards a point as a centre.*

"Of this sort is gravity, by which bodies tend to the surface of the earth; magnetism, by which iron tends to the loadstone; and that force, whatever it is, by which the planets are perpetually drawn aside from the rectilinear motions which otherwise they would pursue and made to revolve in curvi-

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linear orbits. A stone, whirled about in a sling, endeavours to recede from the hand that turns it, and by that endeavour distends the sling, and that with so much the greater force, as it is revolved with the greater velocity, and as soon as ever it is let go, flies away. That force which opposes itself to this endeavour, and by which the string perpetually draws back the stone towards the hand, as the centre of the orbit, I call the centripetal force. And the same thing is to be understood of all bodies revolved in any orbits," &c.

"If a leaden ball projected from the top of a mountain by the force of gunpowder with a given velocity, and in a direction parallel to the horizon, is carried in a curve-line to the distance of two miles before it falls to the ground, the same, if the resistance of the air was taken away, with a double or decuple velocity, would fly twice or ten times as far. And by increasing the velocity we may at pleasure increase the distance to which it might be projected, and diminish the curvature of the line which it might describe, till at last it should fall at the distance of 10, 30, or 90 degrees, or even might go quite round the whole earth before it falls; or, lastly, so that it might never fall to the earth, but go forward into the Celestial Spheres, and proceed in its motion *ad infinitum*."

Now, in these two brief citations you have, in Sir Isaac Newton's own words, the sum and substance of his arguments in support of the theory that the heavenly bodies could be held in their orbits and made to revolve by gravitation. As regards the first illustration of "a stone whirled about in a sling," I can only ask (as I did in my Cambridge paper),—Does the string, in the case supposed, "draw back" the stone towards the hand, or merely restrain it, or hold it, at a certain distance from the centre? And, could a force like gravity act as the string does? Let a rod of wood or iron be substituted for the string, and it must be self-evident that the rod does not and cannot "draw back" the stone attached to it. But I equally maintain that the string does not draw back the stone, but only holds or restrains it; and that a positive and, if I may so say, elastic force like gravity could not act as the string or rod does.* Now this illustration is of more consequence than might at first be thought possible; for, when well considered, and when you once fully realize the fact that the string does not in the least draw back the revolving stone, but only holds or restrains it from flying away, you will find it impossible to accept any kind of *quasi*-demonstration that might seem to prove the contrary.

38. But the popular notion is, that there can be a kind of balance between the force of gravity and a projectile force, that would enable bodies to revolve in a perfect circle; or, in

* Vide *Mech. of the Heavens*, §§ 41—44.

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other words, it is held, that "when a body revolves in a circular orbit, by means of a force directed to the centre of the circle, the centripetal and centrifugal forces will be equal." * Now, if you will only keep in mind the fact, that when a stone is made to revolve at the end of a string, the string does nothing but *hold* or *restrain* the stone, and is *not* "a centripetal force" that "draws back," according to the *Principia*, you will reject this popular notion, or at least see that it requires some better proof before acceptance. This imagined "balance" between a force of projection and gravity, reminds me of the mythical balance of Mahomet's coffin between heaven and earth,—only it is less rational. Granting that it might be just possible to balance an iron box half-way between a magnet and the earth, (which I do not, however, admit,) still the balance would necessarily be so fine, that the slightest breath, or anything producing the slightest vibration, would destroy the balance, and down the box would fall. Mahomet's body would then certainly "go to the mountain" of the earth, and that with a vengeance! But however conceivable such a "balance" might be as a *statical* problem, or (perhaps I should rather say) puzzle, I venture to add that as a *dynamical* conception, when carefully considered, it is well-nigh foolish. A constant force like gravitation must needs always overcome any single impulse once given to a gravitating body, however great the impulse might be. And Sir Isaac Newton's other illustration, with his reasoning upon it, is extremely weak and faulty. For small distances on the surface of the earth, such as for two or even twenty miles, when the earth may be regarded as a level plain, and gravity as acting in parallel directions downwards, what he says as regards the distance a ball might be projected is approximately true. The parabolic theory of projectiles is, in fact, based upon these two assumptions. But when he goes on to apply the same reasoning to a projectile supposed to be made to "fall at the distance of 10, 30, or 90 degrees," the curvature of the earth's surface, and the converging of the lines of direction in which gravitation really acts, ought not to have been disregarded. I know not whether to consider it as amusing or sad, to find such an instance as this of "absence of mind" on the part of the great Newton. His whole reasoning, to prove that gravitating bodies might be projected so as to go forward and revolve in the celestial spheres, is really based upon results previously arrived at upon the supposition that the earth is a level plain, and that gravity acts in parallel lines, and not in lines con-

* Grant, *Hist. of Phys. Astr.*, p. 23, note.

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verging to a centre! But this is, after all, quite in keeping with the extent of "the fall of the moon from the tangent to her orbit," being computed from an *unreal* fall from an *imaginary* tangent to an orbit that could have *no actual* existence (unless the earth were *at rest*), and with gravity acting in *parallel directions*, instead of towards a centre! (§ 32.)

39. But I feel that it is now time to bring this paper to a close. I must apologise for its great length, and yet observe that it is far too brief to do full justice to so large and complicated a subject. My remaining words, also, like those with which I commenced, must further partake of an apologetic character. I know very well from experience, that two remarks are likely to be made off-hand, both about this paper and what will be called "my peculiar views." Some of your "scientific" friends may tell you very plainly, that "*they* know I am all wrong"; and others may ask, what may seem to be a very pertinent question, namely, "How the astronomers can make their accurate calculations of the positions of the planets and of the periods of eclipses, if *all their astronomy* is as wrong as I wish to make out?" Now, I must reply, that this question could not be put by any one, however "scientific," who understands the subject, and knows the difference between theoretical and practical astronomy. And I venture to say that neither such questioners, nor those who would fain decide with a word of authority that I am wrong, are likely to enter the lists in order to exhibit to you my errors. If they do, however—and they are at least fairly challenged,—I shall be agreeably surprised, and will feel greatly indebted to them. My delusion, if I am wrong, must be even greater than theirs; for they can plead great names, a long tradition, and that most powerful corrupter of the human intellect, inveterate prejudice, as all on their side; while I—unfortunately, I must admit, with seeming presumption—stand almost alone, and *contra mundum!* Let me then plead, in these circumstances, at least,—for refutation and enlightenment and unsparing criticism. I beg for this, much rather than for observations which may be confirmatory of any of my arguments, on the present occasion. Not that I despise the latter; for I am about to cite a few words from a recent pamphlet "by a Wrangler,"* which may serve as the best answer to the question, which I have anticipated might be put by some, as to the calculations of astronomers. The "Wrangler" says:—

* *The Theories of Copernicus and Ptolemy.* (Lond.: Longmans, 1867.)

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"It is a common notion, and one popularly believed to be unanswerable, that the calculations of the positions of the planets, the periods of the comets, the times of eclipses, and other astronomical problems solved by the application of Newton's beautiful theory of gravitation to orbital motion, and so marvellously confirmed by the actual observation of the phenomena in the heavens themselves, essentially require, as their starting-point, the supposition of the earth's *absolute* motion round the sun.

"That this is not a true notion will appear evident, simply from this, that astronomers actually make some of these calculations on other hypotheses.

"The mathematician, before commencing his calculation of the motion of a heavenly body, is obliged to seek for some point either really fixed in space, or, if that be impossible, to suppose some point to be fixed: such a point is commonly called the *origin of co-ordinates*. . . . .

"Practically, indeed, the astronomer chooses the origin of co-ordinates quite arbitrarily, placing it where he will be able most easily to simplify the analytical process which any particular investigation requires.

"Thus, for example, in the *planetary theory* . . . the centre of the sun is taken as the fixed point, and the earth, together with all the other planets, are supposed to revolve round it.

"On the contrary, in the *lunar theory* the centre of the earth is chosen as the fixed point, &c. . . . .

"Again, in Goodwin's 'Mathematical Course,' art. 12 of the section on astronomy [this passage occurs]: 'According to observation, the sun appears to move round the earth; but the phenomena will be exactly the same whether the earth moves round the sun, or the sun round the earth.' . . . .

"The practice, then, of astronomers favours neither theory, and ignores the question of *absolute motion* altogether, recognizing merely that which is *relative*." (Pp. 3—6.)

40. Afterwards, the "Wrangler" goes on to ask and to answer a question, which will probably astonish all who hear or read this paper much more than anything I have yet said. He asks:—

"Has it ever been demonstrated that the earth revolves round its own axis?" [And his answer is] "I must reply in the negative, and assert, moreover, that we shall not find that its demonstration is claimed in any truly scientific treatise, although by every one its revolution [he means rotation] is assumed to be a most probable truth." (P. 26.)

Again, he goes on:—

"Should, then, the earth be at rest on its own axis, the only alternative we have is to suppose a revolution of the whole heavens in the short space of twenty-four hours.

"Startling as this is, we have seen that it has not been demonstrated to be mechanically impossible, as far as the terrestrial phenomena are concerned;

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and now I shall proceed to show that, so far as our knowledge goes, we cannot consider it to be even improbable." (P. 31.)

I must make two further brief citations from the "Wrangler's" pamphlet. He comes to this conclusion, among others :—

"(2.) That the law of mutual attraction is not universal ; some constellations attract while others repel." (P. 32.)

And he goes on—

"As [this] answer implies that Newton's law of gravity is not universally true, and drives us to the assumption of some conflicting law of repulsion, there must be a more general law, comprehending these two, which shall determine under what circumstances each of these opposite forces is to act ; but of this law we know, as yet, nothing." (P. 33.)

41. I have made these citations from this remarkable pamphlet—chiefly remarkable because it comes from a Cambridge wrangler—for the sake of its facts and mathematical testimony, but not as always agreeing with the candid author's arguments. He takes, in fact, "a too simply mathematical view of the case,"—in that respect being thoroughly Newtonian! (*vide* § 15.) Mathematically, no doubt, and as far as practical astronomy is concerned, it may not signify whether the earth or the sun is regarded as in the centre ; but theoretically and physically it makes all the difference in the world. If the sun is regarded as the centre, with the earth describing an orbit round it at a distance of 91 million miles, and the exterior planets are all still further and further off, then the fixed stars are necessarily banished far away to the inconceivably immense distances that current physical astronomy assigns to them. But if the earth is in the centre, whether at perfect rest or only rotating on its axis, then all these enormous distances would be reduced, either on the Ptolemaic theory or on that of Tycho Brahe. And this brings me naturally to another question, which I have frequently been asked, namely, What theory have I of my own, to substitute for that which I have claimed to upset? To that question I beg leave to reply, that twenty-seven years ago I should have been much more likely to propound a fresh theory than I am now. In fact, I then had a theory, and at that time it was *not* anti-Copernican, but proceeded upon the hypothesis which I had been taught, like you, to believe in from childhood, namely, that the sun is at rest and the centre of our system. I frankly confess, however, that the more I have studied this subject, only the more inclined have I become to depart from all the teachings of our current physical astronomy! And I must observe that it is a popular delusion to suppose, that a helio-

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centric hypothesis was never heard of before it was propounded by Copernicus, and is so rational that everybody ought to accept it the moment it is advanced. Pythagoras, "the first philosopher," taught a heliocentric theory 2,000 years before Copernicus, and there was also the Egyptian system and the theories of Apollonius and Heraclides. The idea of physical astronomy ever again becoming completely revolutionized may seem monstrous to those who have not gone deeply into astronomical problems; but it should be remembered, that, even when the subtile forces of nature were very imperfectly known, and when the heavens were supposed to be regulated by geometry and mechanical arrangements of various circular movements, even then the two greatest mathematicians who ever lived, Euclid and Archimedes, as well as Eudoxus, Hipparchus, and Aristotle, all "deliberately preferred the geocentric solution of the astronomical phenomena." * And since even a Cambridge wrangler has put forth a plea in favour of the Ptolemaic system, and acknowledges the necessity for some law of repulsion to counterbalance that of gravity, I may now perhaps venture to conclude this paper with a few passages from the first tractate† that I published on this subject seven years ago, which will express nearly my present views, and at least as much of fresh theory as I have any inclination now to indulge in :—

"Supposing cold to be the cause of gravitation, acting as it were externally, and pressing all bodies, in proportion to their matter, towards a centre, from every side. And suppose the sun to be in such a centre of the solar system, and the effect of its heat to be repulsive, and contrary to the cold causing gravitation. Then, the fatal defect in the theory of universal gravitation would be supplied; for when bodies approached the sun they would thus again be repelled; and the more directly and with the greater velocity they approached it in their revolutions, the more violent would be their repulsion, as, for instance, in the case of comets."

"It also follows from what has been laid down, strange as it now may sound, that the heavenly bodies *might* revolve in crystalline spheres, either perfectly round or elliptical, that is, if *not* attracted towards the centre, as was supposed to be the case by a very ancient system of astronomy; or that they could be carried round their centres in circular vortices of ether, or some other element, as was held by the Cartesians; or they could revolve if held by some balancing and opposite powers or forces of nature, that could really act as centripetal and centrifugal forces of attraction and repulsion, both equally constant, and alternately increasing and decreasing, so as to

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* *The Astronomy of the Ancients.* By Sir G. C. Lewis, Bart., *in loc.*

† *Vis Inertiæ Victa*, § 137, note, and §§ 142—146.

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counterbalance one another, and produce the elliptical motions of the planets round the sun, if their orbits are elliptical. But it follows also, that the theory of mechanical laws and gravity which have been assigned to them for producing these effects for the last 150 years, are inadequate for the purpose, and that this hypothesis is perhaps, of all others, the only one demonstrably impossible.

"The theory herein hinted at as a substitute, namely, that the laws of the universe are chemical rather than mechanical; and that an equally constant and universal repulsive influence must operate to counterbalance any force of gravitation, if gravitation be universal, is equally tenable, whether the Copernican or Ptolemaic systems of astronomy be true. The central heat of the sun, probably the source of electricity also, as well as of light, with the exterior cold, whence may come the principle and currents of magnetism, as opposed to those of the electric fluid, obviously suggest themselves to all who have made the chemistry of creation their study, as such universal and opposing forces in nature.

"On the other hand, it would be vain to deny that, when full regard is had to the contrast between light and heavy substances, between heat and cold, between terrestrial and celestial bodies as they appear; judging from all the analogies of substances of which we have experience, and apart from the preconceived notions as to the physical laws and mechanical theory of astronomy which have been instilled into us from the cradle; there is much to be said in favour of reverting to the old notion of a central earth, surrounded by its glorious canopy and hosts of revolving lights, as after all most probable. That such a central globe would, however, most probably revolve on its axis, and only be at perfect rest at its poles, is also perfectly consistent with the notion above hinted, as to the effects of heat and cold, or electricity and its opposite, in regulating the motions of the earth and heavenly bodies. The expansion of the air and elements from the heat and light of the sun, and its electrical influence (if it have such influence), acting obliquely, and upon one side of the earth at a time, might have originally produced, and may now continue to cause, its rotation.

"Certainly, from all we know of fire and light, it seems more natural to conclude that the heavenly bodies are formed of some such imponderable substances, as it were embodied, and in continual motion, rather than to regard them as formed of dull and heavy matter like the earth. If so—lighter than air of whatever tenuity, lighter than the imagined ether—they might float on the surface of such a surrounding extension of the earth's atmosphere, like the balloon that floats majestically in the air. And, perhaps, now, one may be allowed to speculate thus, as to *how* the universe may be arranged by its all-wise Creator, upon the hypothesis that there are *not* 'more worlds than one.'

"As for the fixed stars, it is not a little surprising that so little modification of former theories has followed the revelations made of late years by our largest telescopes, inconsistent with those theories, which were previously as firmly believed in as universal gravitation and the mechanical laws which

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are now supposed to govern the solar system. I confess that to me there have been even prior difficulties to get over in the theories respecting the stars. I have never read anything like a rational attempt to reconcile the apparent alternate advancing and retreating, or increase and decrease in brilliancy, of some fixed stars, with their theoretical position as suns and centres of systems like our own, in the illimitable depths of space. Nor could I ever satisfy my mind that, whatever their distance from us, their own relative distances from one another—as stars of different magnitudes—and especially when a star of the first magnitude is apparently near to one of the smallest—the one being millions of millions of miles further off than the other—would not be apparently different when viewed from one side of the earth's orbit and from another. That that orbit is 'as a point' merely, compared to the distance of those stars (which is necessary to be believed in order to be satisfied that their relative distances would not alter in the least to our view), is also to my mind one of the mere mysteries of science which seem to be professed rather than believed, or professed to be believed, as a kind of poetry, rather than a rational faith, contrary to understanding. Indeed, both the magnitude and magnificence of the earth, as well as of its orbit, appear too little considered, and altogether underestimated, in contemplating the imagined, but scarcely more than arithmetical, sublimity of the system of the universe, according to our current philosophy. And yet there is a meagreness in the solar system upon that hypothesis, compared with that which regards the earth as a centre, placed there as the habitation of man, God's chief creation, and surrounded by sun, moon, planets, comets, and stars, all to serve for the adornment and use of earth alone, as man's temporary abode, and for the glory of the Great Creator; while all beyond may be imagined the heaven of heavens, illumined with the everlasting light and presence of the Eternal God, surrounded with angels and beings of a higher order than man is now, and with the glorified spirits of men raised to a state of superior existence; where there is and can be no more death, or any of those moral or physical evils which are alike the curse and paradox of man's present state of existence, and which mar the fair face of creation."

The Chairman.—I am sure we must all give Mr. Reddie our thanks for his paper, whatever may be our opinion as to the truth or validity of his arguments. At the same time, this is an institution where we wish these subjects to be freely discussed; and at a time when all we believe to be holy and all that is dear to us is met with the utmost degree of scepticism, it is only right that there should be some who will show that there are some reasons for regarding with scepticism even that which is supposed to be founded on what is believed to be the highest kind of demonstration—mathematical demonstration. I shall be happy to hear what any gentleman has to say on the subject, and invite the fullest and freest discussion.

Charles Brooke, Esq., F.R.S., V.P.—After the very long period of time

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which the reading of this paper has occupied, it is utterly impossible for me to follow out all the numerous points which Mr. Reddie has gone into; indeed, if I were to attempt to do so, I should keep you here until to-morrow morning. I will therefore beg your attention to some few remarks which I wish to make, and the rest must be left; premising, however, that whatever is omitted to be answered, is not omitted because I think it unanswerable, but because it is impossible to take up your time with the answer. In the first place, I would beg leave to suggest to Mr. Reddie that scientific conviction and scientific prejudice are two different things. I have the fullest conviction of the truth of the astronomical theory and the law of gravitation as commonly accepted. My judgment, applied in the best way in which I can apply it to the facts that are capable of observation, has been convinced that these theories are true; and I trust that before I have concluded I shall have, in some degree, led you to suspect that scientific conviction is on our side, and scientific prejudice is monopolized by Mr. Reddie. (Laughter.) I dare say, ladies and gentlemen, you have often heard the story of the juryman who was never placed upon a jury but he invariably found that he had eleven obstinate men to contend with. (Laughter.) With regard to some of the preliminary observations of Mr. Reddie, I may say that I happened to be at the meeting of the British Association to which he alluded—and I have always been rather an active attendant at section A—and I beg leave to inform him, with all due deference, that his paper in 1862 was not declined because the Newtonian theory was attacked, but because it was the opinion of the committee of that section that the attack was really not worth defending, and because we did not feel disposed to be accessories before the fact to Mr. Reddie's following the plan of the "Derby Ram," in *Punch*, running his head against a wall. Now, with regard to the problem of the three bodies, Mr. Reddie has alluded to the strange assumption—that is the lunar theory—that the calculation is based on the supposition of the earth being at rest, and the moon moving round the earth, and the apparent motion of the sun round the earth. With regard to all such points, it may be said that there are many physical facts, amongst others, the actual motion of the moon in space, that are beyond the reach of mathematical analysis. In order to reduce the lunar theory to a differential equation it is necessary to assume that the earth is at rest (hear hear), and that the apparent motion of the sun round the earth is a real motion, and that the apparent motion of the moon is a real motion also. And I maintain that that or any other hypothesis is legitimate unless it can be shown that the effect of that hypothesis invalidates the results which are ultimately arrived at. Because, with regard to the motions of the moon, you are first obliged to suppose that the moon is influenced by the attractions of the planets, and an immense variety of mechanical circumstances, which you cannot put into the calculations all at once. You are obliged to assume that some of them do not exist; and having attained the result which the analysis can bring you to, it is then necessary to ascertain the alterations which it is necessary to introduce, in order to take in the

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other considerations which have been neglected. All this is somewhat tentative, but the actual process is the only one by which, with our present mathematical resources, the results which have been obtained can be arrived at. And that is the reason why in the problems connected with the lunar theory it is necessary to assume in the first instance that the earth is at rest. Now I believe that a great many of the misconceptions—as I believe them to be—which Mr. Reddie has entered into, would be entirely removed if he could only satisfy his own mind of the fact, of which my own mind is perfectly satisfied, that in considering the motion of bodies, it is immaterial whether any other motion which they may have at the same time is taken into consideration or not. I can explain myself better by an instance. The motion of the moon round the earth would be the same whether the earth is supposed to be in motion or at rest; and the action of gravitation takes place upon a body just in the same way whether that body is at rest or in motion. I could give experimental illustrations of this *ad nauseam;* but I will confine myself to one simple illustration. Suppose I have two similar balls, and I project one forward horizontally, while at the same time I let the other drop; it will be found that the action of gravitation upon these two balls is precisely the same: they will reach the floor precisely at the same instant. That simple experiment proves that the action of gravitation is the same in both cases——

Rev. Dr. Irons.—Will you explain whether you mean that this would be the result whatever amount of force was used to project the ball?

Mr. Brooke.—Whatever the amount of force—if it were projected a thousand miles.

Mr. Reddie.—There is no issue between Mr. Brooke and me on that point, though I don't admit that his reasoning from that fact is valid.

Mr. Brooke.—I merely adduce that as evidence that the obedience of a body to the law of gravitation is not affected by its having any other motion at the same time. So in the same way the obedience of the moon to the law of gravitation, which brings it towards the earth, is not affected by the consideration whether the earth be in motion or at rest at the same time. But the necessity for simplifying the considerations of motion might be illustrated in a variety of different ways. For instance, suppose that we take the case of a steam-vessel. It may at the same time be going under steam in a certain direction, and it may have a wind, constant or variable, blowing upon it, which would tend to drive it in another direction. If we wished to investigate the circumstances in any particular part of the machinery or point in circumference in the wheel or screw, how should we proceed? We should not begin by taking into consideration the path in space in which this point we wish to consider is travelling in obedience to the propulsion of the vessel itself, and also in obedience to the wind, and in obedience to the impulse of the steam-engine; but we should simplify our considerations by supposing the vessel to be at rest, and by considering simply the relation of the motion of the point in the wheel to the direction in which it is driven, and afterwards we might add the compound motions to

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the result. Then we may suppose a watch placed upon a table, and suppose it to be placed on a revolving table which happened to revolve in a contrary direction to the motion of the hand of the watch. What would be the result? The hand of the watch would remain in the same direction. We should not, therefore, interfere with the motion of the watch in going. And if we wanted to consider the relation of the motion of the hand to the machinery that drives it, we should not take into consideration the compound motions by which the hand appears to remain at rest; but we should simply consider the motion of the hand in obedience to the mechanical force of the watch which drives it. With regard to Newton's principle of circular or elliptic orbits, the same observation will apply. It is perfectly true that the moon does not describe an orbit, circular or elliptic, but describes a wavy line round the earth's orbit round the sun; but in considering that orbit the difficulties are simplified by considering the earth to be at rest. And it appears as the result of observation that the results deduced from such a supposition are not vitiated by the circumstance of the earth being in motion. Mr. Reddie alluded in his paper to motion in a resisting medium, and he referred to the confusion which would arise from such a supposition. Now the fact is, that the resistance of the medium which is supposed to pervade all space is the means of transferring the vibrations of light and heat from the sun and other sources to us, more especially from the sun to the earth. That it is a resisting medium has been proved by the retardation of Encke's comet; but the reason why it affected Encke's comet was that it consisted only of a mass of vapour, and was so light and attenuated as to feel the least resistance. The earth or planets, being immeasurably heavier, are not affected at all. The motion of the earth in its orbit I believe to be wholly unaffected by the existence of ether, that elastic medium which pervades all space. Not because there is no resistance, but because it is so minute in comparison to the magnitude and weight of the body in motion. I might illustrate it in this way. If you exercise the slightest puff of breath upon an air-ball that a child plays with, you alter its course; but would that afford any ground for supposing that, if you had the courage to stand near the mouth of a cannon, say a six-hundred pounder, from which a shot was about to be fired, and the moment the shot was passing out you gave it a puff, you would have any effect in altering the point at which the ball would strike? Certainly not; and the reason is precisely the same: the force of your breath in the one case and the resistance of the assumed medium in the other were so minute in relation to the mass in motion as to have no sensible effect——

Mr. Reddie.—I have granted quite as much as that in my paper, and reduced my objections to the effect of a resisting medium upon the earth's atmosphere, (§ 27, last 18 lines.)

Mr. Brooke.—I certainly understood that the gist of Mr. Reddie's argument was the assumption that there was a contradiction. He quotes the letter of Voltaire:—"I left the world *full* in Paris, but found it empty in London. In France the earth is believed to be shaped like a melon, but

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here it is flat like an orange." That means that in one case the resisting medium was supposed to exist, and in the other was not; and therefore there was confusion and discrepancy. But as regards the motion of the earth or planets, I mean simply that the influence of the resisting medium is inappreciable, and that it only becomes appreciable when it affects the orbit of a body so attenuated as a comet. And therefore the question of the existence of a resisting medium does not invalidate the conclusions drawn with regard to the earth, the moon, the sun, and the planets——

Dr. IRONS.—Would you apply the same remarks even to motion in the *plenum?* Supposing the motion to get more and more intense, would it never be affected: is it so far attenuated that no amount of velocity would beat it?

Mr. BROOKE.—That appears to be another question. I am speaking of the existing velocities in relation to the moon and sun; but probably the attenuation of the medium is such that no velocity which has hitherto been imagined would be in the slightest degree affected by it. Mr. Reddie goes on to say, "If there be really solar motion in space, and if there be a resisting medium, through which all the heavenly bodies must move, there is not a single demonstration in the *Principia*, whether sound or fallacious, which is in accordance with our 'current physical astronomy'; and no conclusion at which Newton arrived by 'demonstration' in his 'immortal work' is now really accepted by modern astronomers." There I entirely join issue with Mr. Reddie, because, as I have already said, I believe that the resistance of the assumed medium is so minute that it will not affect any of the deductions of modern physical astronomy, and therefore will not affect their relation to the demonstrations or anything else in the *Principia*. Mr. Reddie then says, "The 'revolving body' is supposed to move in free space, 'void of resistance,' and the areas are described 'in one immovable plane'; and it is to these two points I especially desire to direct attention." And, again, "In the last of the corollaries it is said, 'The same thing holds good when the planes in which the bodies are moved, together with the centres of force, which are placed in those planes, are not at rest, but move uniformly in a right line.'" And this, he then remarks, is "an astounding corollary." But it is not astounding at all. Unless it can be shown that the results deduced from this hypothesis lead to conclusions which are at variance with the fact, there certainly is nothing astounding in the hypothesis as at present assumed——

Mr. REDDIE.—A corollary is generally something obviously deduced from what has been previously demonstrated; and I say there never was such a corollary as this in any strictly mathematical work. You will find no such contradictary corollary in "Euclid": first proving that the thing is true in one way, and then assuming that it is all the same if it is supposed to be quite another way!

Mr. BROOKE.—The object of omitting a consideration in the first instance is to simplify the matter to be examined, and unless it can be shown that the neglect of that consideration would lead to an erroneous conclusion it appears to me to be perfectly legitimate. Mr. Reddie says, "So, then, we are to

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believe that it would be 'indifferent' if we were to start the sun off in a right line at the rate of 65,000 miles an hour." No; by no means. Nobody supposes it would be indifferent if, the sun being now at rest, and the existing motions of the heavenly bodies being what they are, we were now to start the sun off at the rate of 65,000 miles an hour. That is a very different question. But it is of no consequence, and will not affect the results obtained, if we suppose that the whole solar system is moving conjointly at the rate of 65,000 miles an hour, or at any other rate. (Hear, hear.) It would make all the difference, however, if you were now to start the sun at that velocity, and not start the other bodies in the same direction——

Mr. REDDIE.—I am letting you suppose that they have all been going together, but say that they couldn't do so by the same forces as when the sun is at rest, which was what Newton supposed. (See § 15, line 24.)

Mr. BROOKE.—Then if they are all supposed to go together, I will simply say that I believe firmly that it would be quite indifferent. I am obliged, of course, to omit a great many points; but in § 19 he says, "It is part of this teaching that stars of the second magnitude, that is, stars only less bright than Sirius, must have been shining in the firmament for twenty-eight years before they were visible on the earth; and that the smallest stars visible to the naked eye must have been invisible for 138 years. The converse absurdity has also been taught, that if such stars ceased to exist, they would continue as visible stars to earthly eyes and telescopes for twenty-eight years and 138 years respectively after their non-existence!" Now, I simply mean to say that there is no absurdity in this at all; and I will in a few words reduce it to his comprehension. Did any one of you ever see a stone dropped into the surface of a still pond and notice the effect? You see some little waves—some little undulations travelling off; but after a very short time the point where the stone was thrown in becomes absolutely at rest. But there the little batch of waves goes travelling on and on to an indefinite extent according to the extent of the lake or sheet of water. It may become less and less visible, but it is still visible to a great distance. Again, I would ask Mr. Reddie, did he ever hear an echo? If a short sudden sound is made, as by a whistle or the blowing of a horn——

Mr. REDDIE.—I was discussing not sound, nor even light, but sight. Sound or light can go round a corner; but you cannot *see* objects so. (Hear, hear.)

Mr. BROOKE.—Wait for my point. What takes place in that case? A batch of waves is sent off through the air; these waves strike an object at a distance; they are reflected at that distance and come back again to you, and that batch of waves then produces upon the ear the impression of sound. Now the case is precisely analogous with regard to light. No one that I am aware of doubts in the present day that light consists of undulations, of vibratory motion of matter of some kind. If that be the case, it is just the same with regard to sound or waves on the surface of a pond. If a body is luminous it has the power of setting in motion these undulations; and,

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supposing that power to cease, you will then have a batch of these undulatory motions travelling on and on from the source of light until they reach the eye, and produce upon it the sensation of light. But it is a matter of perfect indifference whether the cause of those undulations has in the mean time ceased to exist ; for, the undulations having once been excited, will travel through space until they reach the eye, just as the sound undulations will travel through the air, or the waves through water. I therefore say that there is no absurdity at all in the supposition that light may reach the eye after the star or heavenly body that emitted it has ceased to emit light—or, I will say, ceased to exist ; but we know nothing of its existence except by the light——

Dr. IRONS.—Light is a vague word.

Mr. BROOKE.—The impression we derive from seeing a star at any particular moment is just the same whether the star emits light at that moment or not. The star cannot affect the undulations after they are emitted——

Mr. REDDIE.—May I ask this question : If you are right, how is it that the most distant stars dip below the horizon, just as the moon does, and do not continue to exhibit themselves long afterwards ?

Mr. BROOKE.—It is simply this. The stars dipped below the horizon long before we cease to see them. They may have dipped below the horizon days or weeks before——

Mr. REDDIE.—Days or weeks ! If a star, say of the sixth magnitude, sank now, should we not cease at once to see it ?

Mr. BROOKE.—Certainly. The undulations were travelling from the star to us, and at length the star is in such a position that the undulations in that line of light no longer reach our eye, and therefore we cease to see the star. (Mr. REDDIE : Hear, hear.) The star itself will have gone below the horizon long before. That light travels at a certain known rate is established by facts which we know astronomically, and the results which have been obtained with inevitable certainty appear to me to be *post facto* demonstrations of the truth of the theory ; because, if light had not travelled at that velocity many ascertained astronomical results which have followed from the assumption of that velocity would not have been obtained——

The CHAIRMAN.—I know that Mr. Brooke is so well acquainted with the subject that he can inform us whether means independently of astronomical observation have not been employed to prove experimentally that light does take a definite time to travel ?

Mr. BROOKE.—Oh, yes, there are many other means——

Mr. REDDIE.—I have read all about the experiments you refer to ; but formerly they were said to "prove" that the velocity of light was 192,000 miles per second, and now it is said they prove it to be 185,000 miles only per second. (Hear, hear.)

Mr. BROOKE.—I will now pass on to the last point to which I wish to allude. An observation was made with regard to the third law of motion. Now it is quite true that in my little work I have expressed the third law of motion in different terms from those used in the *Principia* of Newton ; but

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I did that simply because I thought the terms I used were not open to misconception. I think the terms in which it is expressed by Newton are capable of some misconception; but the drift of the law is precisely the same in either case. Now, if I have rightly understood him, I will just make a few observations in order to convince Mr. Reddie that he is making a distinction without a difference. Suppose I tie a string to a wall, and pull it with a force of twenty pounds with my hand, the wall pulls my hand backwards just with the same force that I pull the string from the wall; but that proposition Mr. Reddie denies. (Laughter.) Well, Mr. Reddie, no doubt, will allow that if, instead of tying my string to the wall, I pass it over a pulley with the weight of twenty pounds suspended, and I pull the string, the weight will pull my hand back——

Mr. Reddie.—In that case, I say there would be a distinct reaction from the weight; and if you ceased to pull, the weight would descend.

Mr. Brooke.—My object is to show that the reaction is the same in either case. Suppose that, instead of tying the string to the wall, I attach it to a spring, and with a force of twenty pounds draw it from the wall. Mr. Reddie, I assume, would admit that it pulled my hand back?——

Mr. Reddie.—I have noticed that kind of reaction, which is perfectly real. The spring acts like the weight.

Mr. Brooke.—If I double my force of pull I shall only pull the spring out half the distance, and as I increase it the spring will become so strong that I cannot pull it out at all, until at last it becomes a part of the wall. In that case the reaction is just the same as in the other case; and I would ask Mr. Reddie to say where he would stop. He admits that a suspended weight reacts upon my hand, and a spring also; I therefore ask where the reaction ceases?——

Mr. Reddie.—Wherever there is no elasticity, or pull, or spring, in the opposing force; wherever you have rigidity. Take, for instance, a horse drawing a stone. If you brought the string over a pulley, of course the weight of the stone would pull back the horse, if the horse did not keep up the tension. There is then a distinct reaction, but you know the cause of it.

Mr. Brooke.—As the spring becomes stronger and stronger the hand will be drawn out less, until at last it is not drawn out to an appreciable degree. Again, I will go further, and assume that I did pull the wall out—that the wall bends to some indefinitely small extent—a millionth part of an inch, say. I dare say Mr. Reddie may dispute the possibility of that, but I have no doubt that if one could only put a rope round the top of Eddystone lighthouse, and pull it out with sufficient force horizontally, one would be able to sensibly bend the whole lighthouse; and when you released the rope it would go back again. Where, then, does the reaction cease?——

Mr. Reddie.—It is not equal to the action. That is my point. I have never denied resistance in such a case; but reaction and "equal reaction."

Mr. Brooke.—But I think I have shown that it is always equal. When I pull the spring out, the reaction of the spring is equal to the pull I put upon it——

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Mr. REDDIE.—No, no ; if equal, you could not have pulled it out ; and if the wall continued rigid, there would be no spring or reaction.

Mr. BROOKE.—But if there is no reaction when the string is fixed to the wall, I want to know where the reaction ceases. It is a distinction without a difference. (No, no.) I would only say, as a last remark, that nothing has ever impressed my mind with the conviction of the truth of the law of gravitation more strongly than the projection of eclipses ; in which, basing your calculations upon the law of gravitation, you can, months beforehand, state the time to a second, and the spot, within a small space, where the eclipse will occur. But the discovery of the planet Neptune from the disturbances of Uranus was a still stronger proof. I may mention that the planet Uranus was observed to have certain disturbances in its orbit motion in an unaccountable manner. M. Le Verrier, of the Paris observatory, and Mr. Adams, in this country, set themselves to discover where and of what magnitude a body must be which could, by its attraction, affect this disturbance, and they both came to very nearly the same conclusion as to place and magnitude of this body. M. Le Verrier communicated to another French astronomer where he supposed some body must be, and he looked for it in his telescope and found it. The result arrived at by our own astronomer, Mr. Adams, were unfortunately for a time laid by, and we in this country lost the merit of the discovery of the planet Neptune. But it was described inductively from assuming the law of gravitation to be correct, and finding where the body according to it must and ought to be placed in order to produce such disturbances ; and there the body was found. Nothing can convey a stronger conviction to my mind than such facts as these that the theory of the law of gravitation is substantially true, and that the principles advocated by Newton are also substantially true ; and that some of the difficulties which Mr. Reddie has laid hold of are only difficulties which have been necessarily introduced into calculations founded on these grand principles in order to bring the facts within the scope of exact analysis. (Applause.)

Admiral FISHBOURNE.—I will detain the meeting only a few minutes while I refer to what Mr. Brooke has said about the effect of a breath of wind on the direction of a ball fired from a cannon——

Mr. BROOKE.—Excuse me ; a man's breath, not a breath of wind.

Admiral FISHBOURNE.—That is only a difference of degree. Now, it has been established, by means of a very elegant instrument, that a round ball projected with only a limited velocity as compared with the motion of a heavenly body, rotates, and, because of its rotating in its progress, one side of the ball is receding from the wind and the other is approaching it ; and the result of that is that the difference between the action of the air on one side and on the other deflects the ball in its course. If that is the case even in our atmosphere, though it is not so attenuated as the medium the heavenly bodies traverse, there can be no doubt there must be a difference in their velocities, when moving in a plenum and a vacuum— —

Mr. BROOKE.—Of course, every rifleman knows that it is necessary to

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allow in taking aim for the effect of the wind upon the ball ; it is a question of resistance.

The CHAIRMAN.—No, it is not a question of resistance ; it is the very reverse.

Mr. BROOKE.—It is, indeed.

The CHAIRMAN.—It is a different thing altogether. I think Mr. Brooke has mistaken Admiral Fishbourne's point. It is this. We are not dealing with a circular ball, but with a bolt. The wind acts upon it more on one side than on the other as it is revolving on its own axis, and the consequence is that it is deflected from a straight line, not by the resistance of the air, but by the effect of the wind upon it. It is not a case of resistance, but of deflection, which is a totally distinct thing. (Hear, hear.)

Admiral HALSTED.—It is shown by the experiments of Mr. Glaisher that at the extreme point of the atmosphere from the surface of the earth it is very attenuated ; so that, upon the upper surface of the atmosphere, we should get a medium scarcely more dense than Encke's comet itself. I merely mention the point with regard to the effect it would produce.

Mr. BROOKE.—The fact is unquestionable that the density of our rarest atmosphere is so great compared with the density of the ether, that the moment one of those shooting stars enters the confines of our atmosphere it becomes red hot, and is very soon ignited and burns away ; whereas it has travelled indefinitely through ether without being sensibly warmed.

The CHAIRMAN.—That I doubt altogether. (Laughter.)

Mr. BROOKE.—That is my belief.

Mr. REDDIE.—There is no proof of that, of course ?

Mr. BROOKE.—No proof at all, but strong inference. But there is abundant proof that aërolites——

The CHAIRMAN.—But that is a totally different thing. I read a paper in which I endeavoured to show that there was no analogy between aërolites and falling stars.

Mr. BROOKE.—I think I have read the paper. (Laughter.)

The CHAIRMAN.—I have few observations to make, except to say that I doubt whether Mr. Reddie is altogether right in the title of the paper he has read, as being in opposition to "current *physical* astronomy." I do not think his paper really touches current physical astronomy at all. A great part of the paper is directed against arguments contained in Newton's *Principia*, but more against mathematical methods made use of by him than those current amongst physical astronomers of the present day. I believe that, in order to attack current physical astronomy, you will have to attack, not the mathematical processes of Newton, but those mathematical processes which have been introduced by astronomers into the present system, which is in the main very different from Newton's. (Mr. REDDIE.—Hear, hear.) His very peculiar kind of geometrical analysis enabled him to solve the problem of the three bodies, but only to a certain limited extent ; and it has been conceived by some that had Newton lived, and had more facts of physical astronomy been brought within the range of his vision, probably his powerful

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mathematical mind would have enabled him to devise processes by means of which that mathematical system of reasoning could have been improved, and made to bring in facts which are now supposed to be brought into physical astronomy——

Mr. REDDIE.—Do you mean theoretical or practical astronomy?

The CHAIRMAN.—What I mean is this. There is a difference between what is technically called plain astronomy, which deals with the actual, visible motions of the planets, and that which accounts for motions that are matter of theory. This is called physical astronomy, and it consists in the main of two parts—namely, what is called the lunar theory, and which accounts for the exceedingly complicated apparent motions of the moon with respect to the fixed stars; and the planetary theory, which accounts for the equally complicated motions of the planets. Physical astronomy does not go much beyond these two theorems: the apparent motions of the moon amongst the stars, and the apparent motions of the planets amongst the stars; and extremely complicated motions they are. If you traced them on the celestial globe, you would find that they described curves of the most complicated character. It is the business of physical astronomy, on the hypothesis of gravitation, not only to account for these extremely complicated motions but to do more than this: to predict the position of these bodies, and tell where they will be at any future time. The mathematical astronomers were for a long time bigoted to the processes of Newton, and while they were physical astronomy made no progress in this country. (Hear, hear.) Astronomers who were not prejudiced, however, took up the methods of Leibnitz, and the consequence was that they were able to predict the motions of the moon amongst the stars. And therefore, supposing that the whole *Principia* was abolished at once—if it were given up, you have not attacked current physical astronomy, because it does not the slightest degree depend upon Newton's *Principia*, or any proposition in that *Principia*, except the assumption of the three laws of motion. Current physical astronomy is based upon the assumption of the law that Newton determined—namely, that of gravitating bodies attracting one another directly as their masses and inversely as the square of their distances. Take that hypothesis for granted, and combine it with the three laws of motion—not one of which can be obtained from direct experiment, but which are derived incidentally from thousands of experiments, and deduced rather than proved,—and the physical astronomer maintains that he can predict these exceedingly complicated motions, so as to account for the positions of the heavenly bodies with an extreme degree of accuracy. The question is, can the physical astronomer do so? You can attack him in two ways. You can show that his mathematical analysis is unsafe, and not fit to be trusted; or you can show, which is still more important, that he cannot calculate these things beforehand—that observation does not agree with his theory. I think that is the way in which current physical astronomy is to be opposed, and not in the manner Mr. Reddie has done. For if he has done anything at all, all that he has done is to oppose Newton's mode of demonstration and mode of reasoning in the *Principia*.

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I do not think that it has at all interfered with the facts of physical astronomy; but at the same time one cannot help feeling that there is a great deal to be said on the other side. I think considerable light is thrown upon it by the well-written and cautious paper published in the name of a Cambridge "Wrangler." The question is well put, not whether the law of gravitation is true or false, but whether we are to adopt the Copernican or the Ptolemaic theory. It is generally assumed that the theory of gravitation can only be supported on the Copernican theory. What do physical astronomers do in the celebrated problem of the three bodies? As to the lunar motion, they assume that the earth is in the centre, with the moon moving round the earth nearly in a circle, and the sun also moving round the earth at a certain distance nearly in a circle (Mr. REDDIE.—Hear, hear); and then they apply the differential calculus to get a differential equation, which assumes the three laws of motion and the law of attraction —of gravity. Thus they get a differential equation, which they cannot solve (hear, hear), and then, by various extremely clever devices, and a successful series of mathematical dodges, they get at—not the real motion of the moon, because they take the earth as the centre — but the apparent motions of the moon, as seen from the earth. (Hear, hear.) But, supposing the earth to be perfectly still, and the moon moving round it, the theoretical path of the moon is not an ellipsis, and not any known curve; and, moreover, it is not in any one plane, but in a plane which is constantly in a state of oscillation. Thus you get for the motion of the moon one of the most complicated curves that the mind can conceive. But why did astronomers reject the Ptolemaic theory and accept the Copernican? Because the latter was supposed to give the simplest possible motions. But modern physical astronomy gives us motions of such an exceedingly complicated character, that the argument of simplicity does not apply to the present system any more than to the Ptolemaic. Then Mr. Brooke very pertinently said that one of the greatest proofs of current physical astronomy was its power of predicting eclipses and the moon's motions. To my mind, one of the most astounding things is that little nautical almanac, in which you have the moon's position calculated years before. Now, does that agree with the theory, or does it not? You will say that if it does agree with the theory it will prove the modern theory to be true, and not the Ptolemaic. The Cambridge "Wrangler" says it does not do anything of the kind. Your mathematical analysis has been based upon the assumption that the earth is standing still. (Mr. REDDIE.—Hear, hear: that is just my argument.) You have calculated all these motions upon an hypothesis which is as likely to be true as the converse; so that anything that you prove with regard to the motions of the moon, or with regard to eclipses, can be held to be equally true, whether you take the current system of belief of the sun being fixed in the centre, with the moon rotating round the earth, and the earth round the sun; or, suppose the earth to be fixed, and the moon and sun rotating round it. (Hear, hear.) Therefore you get no direct proof from the lunar theory of the present system of current physical astronomy. But the Cambridge

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"Wrangler" has altogether left us in the dark as to the mode of accounting upon his own system for the exceedingly complicated motions of the planets; and I think that the strongest possible confirmation of current physical astronomy is that the planets are not only moving round the sun, but occupying those positions in the atmosphere which they would do according to the current hypothesis. I do not see that Mr. Reddie has refuted in any way the differential equation, or the solution of it, which gives you these motions. There are two ways of attacking this theory. I do not think we have anything to do with what Newton said. The way to attack it is to show first that the mathematical analysis is not true; and you may possibly be able to do that, for I do not know that it is impregnable. It requires an enormous amount of faith to digest the differential calculus; but, when you have digested it, it will account for myriads of phenomena amongst the heavenly bodies. But, then, it is fair to state beforehand that the whole of this is not so much matter of demonstration as it is supposed to be. (Hear, hear.) After all, you put into it all sorts of disturbing calculations. You say you will begin with the three bodies, but by-and-by you take one out to put another in, so that there is always a little "tinkering" and a little finding out that something has been neglected which ought to be taken into consideration. (Hear, hear.) Then, with regard to the greatest triumph of the mathematical planetary theory—the discovery of Neptune,—Mr. Reddie brought the matter before this society, supported by the authority of astronomers of eminence in America, and said that there was the greatest possible discrepancy between the elements of Neptune as calculated by Le Verrier and Adams, on the perturbation theory, and the elements as calculated from observation since, by Mr. Walker. Therefore I think that, as a matter of abstract science, we cannot assert that the discovery of Neptune has demonstrated the theory of gravitation.

Mr. Brooke.—I cannot argue that matter without the data. The calculated orbits might or might not correspond, but that would not invalidate the fact that the position of the body causing the disturbing influence was first assigned and then found to be in the place assigned to it. That fact is not impugned.

Admiral Halsted.—I wish to ask Mr. Brooke a question of professional interest as to the length of time it takes light to travel to the earth. For instance, I get the meridian of the sun at noon. Now, is the light which I get into my sextant actually then proceeding from the sun, or has it proceeded from the sun long before?

Mr. Brooke.—Eight minutes previously.

Admiral Halsted.—With regard to the question of the stars going out when they go down, say I have been taking my observations of a particular very distant star, and it has gone down. On the following night I pick it up for the same purpose. I look out for that light again. Is there a special law with regard to that? What is the distance of time by which I ascertain exactly the variation between the light which I use and that which has left the star?

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Mr. Brooke.—It is easy to calculate the time which the undulations of light emitted from a particular star take to reach the earth.

Admiral Fishbourne.—Supposing the light has been travelling in space for one hundred years, and he wants to get the position of the star at the moment when he takes the observation?

Mr. Brooke.—The position of the star bears the same relation to the earth and the moon and surrounding objects as it did yesterday or a hundred years before.

Dr. Irons.—I think it is important that we should know whether the calculations with which the public mind is familiar—those which produce a knowledge of eclipses—are really to be made on the old Ptolemaic theory.

The Chairman.—I do not think Mr. Brooke or any other gentleman can contradict my assertion. Our books on physical astronomy are open to everybody; and you will find that, so far as the lunar theory is concerned, it is calculated according to the Ptolemaic theory. (Mr. Reddie,—Hear, hear.) All our mathematical demonstrations of the lunar theory go upon the assumption—the convenient assumption—of the Ptolemaic theory. The planetary theory, however, assumes the sun as the centre of the system, and gives the strongest probability to the Copernican.—I now call on Mr. Reddie to reply.

Mr. Reddie.—In the first place, I must observe, with reference to the criticism upon the title of my paper, that I differ, of course, from you, sir, with great deference, and very unwillingly. But still I must defend the title of my paper. According to all the books on astronomy with which I am acquainted, what you have been speaking of as physical astronomy is usually called "practical astronomy." Leaving this, however, I am extremely obliged to you for what you have said in answer to some of the remarks of Mr. Brooke, especially as to the calculation of eclipses. But you have not answered him completely. Eclipses were calculated not only long before Newton's time, but before Copernicus, and I might even say before Ptolemy, in Egypt, India, and China. Long before they were known to the observations of astronomers in this country or in Europe, they were known to the astronomers among the ancients; and eclipses were not only accurately calculated, but critical chronology actually rests upon those calculations and observations. As to the modern mode of making such calculations, of course I am extremely obliged to the Chairman for so completely answering the first part of his speech by his later remarks. (Hear, hear.) He has told us of the extremely convenient "devices" or "tinkering" which are had recourse to, and it is no doubt extremely convenient, when you are out a little in your theoretical calculations, to be able to add something to make you right. And, in fact, this is an admission that these calculations prove nothing, being vulgarly what we call "dodged." But I venture to say that the main points I have thrown out in my paper for discussion have not been really met. (Hear, hear.) Mr. Brooke has chiefly noticed what may be regarded as merely incidental points, which, for that reason, I almost now regret I introduced into my paper. And yet they are of importance in their proper place. As regards action and reaction——

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[Mr. Reddie here proceeded, with the aid of diagrams on the black board, to give illustrations in reply to Mr. Brooke. He afterwards continued]—
I must, however, give a still better answer than this to Mr. Brooke's arguments in defence of action and reaction this evening, by quoting from the 5th edition of his own very valuable work on *Natural Philosophy*, where you will find he has said almost as much against it as I have myself. He says :—

"The Third Law of Motion has sometimes been expressed by the terms 'action and reaction are equal, and in opposite directions;' which have been abandoned, from the difficulty of assigning any definite meaning to the terms action and reaction" (§ 200).

Well, then, if this is Mr. Brooke's own deliberate verdict, or rather testimony, against these terms, you need not be surprised if he failed to give us a very distinct explanation in defence of them now. Of course, as the preamble to my paper itself will show, I am quite aware that it was not to be expected that views so "heretical" and opposed to current opinion could be at once accepted : I was not even unprepared for a few jokes ; and I am really only sorry that my arguments have been so vaguely met. I beg to assure Mr. Brooke that I did not mean that the prejudices which I know are opposed to me, are not supposed to be based on conviction. In my paper I say they are not only supposed to rest upon the demonstrations of the *Principia*, but to have the "decision of time"—meaning experimental verification—in their favour. One, and the grand illustration of this, was the discovery of *Neptune*. Well, as to this, the facts are on record in our *Journal*.* I appeal to those facts, when properly understood and weighed. I may also say as regards the rejection of my paper at Cambridge in 1862, that in my account I give the reason for its rejection given to me by Professor Clifton, Secretary to Section A, the first morning the Committee sat, when, perhaps, Mr. Brooke was not present. I published that account immediately, and it was never questioned by Professor Clifton, nor till now ; and I can only conclude that at this interval Mr. Brooke has forgotten what really occurred. As regards the transmission of light from the stars, and Mr. Brooke's replies to Admiral Halsted's very pertinent and important queries, I can only say I am content to leave what has been said to-night, and what I have said in my paper, for further reflection. What I have said I know is startling ; but it is only so because, unfortunately, we have got accustomed to the much more startling ideas put forward to us in the name of science, which we have too credulously believed, but which I venture to denounce as merely and grossly absurd. With regard to Mr. Brooke's illustrations of a watch going round while carried along, all that he said is perfectly true of motions when bodies are attached mechanically to one another. Mr. Brooke will find that fully admitted and dwelt upon in the paper "On the Motion of the Moon," appended to that which I read this evening. There I fairly meet Newton's

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* Vol. II. pp. 69—71.

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and Ferguson's mechanical illustrations, and show their inapplicability, by supposing (instead of motions in the cabin of a vessel) you have two separate steam-vessels attached to one another by a rope; and first suppose one of them to be at rest, and the other to steam round it at the rate of two knots an hour; that will give the string a certain tension which may represent gravity; but if you start off the stationary vessel at ten knots, what would be the effect? It would then drag the other after it, the tension on the rope only being lessened *pro tanto* by the two knots at which the other was steaming. But in order that the latter should now steam round the former as before, it must sometimes steam twelve knots an hour in the same direction; and even when *appearing* to go the other way, it must be steaming eight knots, and still in the same direction. But I say that you could not have two free bodies thus held together by attraction—one going steadily at ten knots, and the other sometimes at twelve knots, sometimes at eight knots an hour,—and that there is no attempt at demonstrating anywhere that such a thing is dynamically possible. If the bodies were mechanically attached by ropes or rods, that would be another matter, though even then you would require a "law" other than attraction to explain these greatly varying velocities. Therefore I say the moment you adopt the theory of solar motion in space you upset Newton's *Principia*. But Mr. Brooke has not alluded to the fact that the Astronomer Royal himself has now given up this theory. And it is no answer to the objections I have urged against current physical astronomy to say that I furnish you with no theory to take its place. I might rather take credit for that. And, at any rate, you cannot believe a thing which is proved to be untenable, merely because you cannot properly account for the phenomena in some other way. It is better and simply honest in such circumstances to say that we do not know, when in sober truth we are in ignorance.

The CHAIRMAN.—So far as I have read Mr. Reddie's works, he has answered the popular explanations of such men as Airy, Herschel, and others, rather than the purely scientific part of the question. The interpretation of the differential equation is of that kind that it is impossible to bring it before the popular mind except by rough illustrations. The popular lectures on gravitation by Airy, are just an attempt, by a rough kind of illustration, to give some kind of idea of what would be the motion of the heavenly bodies according to Newton's system of gravitation. There is no rigid demonstration in them. Men like Michell have simply copied what was written by Airy and Herschel. As I have already said, the way in which physical astronomy is to be attacked, is either by showing that the differential equations depend on unsound assumptions, and that the calculations made by their aid, of a series of complicated phenomena, are not to be relied on; or else that those complicated phenomena do not agree with mathematical demonstration, or that they can be explained in some other way.

Mr. REDDIE.—It is too late now to renew the discussion, and I was not prepared for a second attack after having made my reply. I beg to be

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allowed to say, that I have pointed out "unsound assumptions," such as assuming the earth to be at rest, in the lunar theory, and the sun in the planetary theory; and I appeal to my paper to show that I have scarcely quoted Professor Airy's lectures at all, and only to show that in them he declared that every astronomer did then believe in solar motion in space, which is now given up, or considered as in "doubt and abeyance." And I refrained in my paper from quoting from Michell's somewhat sensational work,—though in such works you really get the frankest confessions of such extreme absurdities as I have noticed, as to stars taking hundreds or thousands of years to become visible, or remaining equally long visible after extinction,—but I know that the same things are really to be found in books of men such as Herschel and Airy, who are properly responsible for them.

The discussion then terminated, and the Ordinary Meetings were declared adjourned till next Session.

[Having cited the pamphlet of a "Wrangler" (pp. 406, 407, and 422), it is only fair to publish the following letter from him, which will, no doubt, be read with interest:—

"*March* 21*st*, 1870.

"Sir,—I find from Messrs. Longmans that I have to thank you for a copy of your Paper read June 21st, 1869, at the Victoria Institute.

"I have already read it through, and find it extremely interesting; and I see that there is much which deserves *very* careful consideration. If after reading it *thoughtfully*, I find anything suggested to my mind which would help to develop the ideas contained in it, I shall take the liberty of sending you a few lines.

"As you do me the honour to notice my pamphlet favourably (*The Theories of Copernicus and Ptolemy*), I would add that I see reason for modifying some of the views as they are expressed in it; but I am quite convinced that modern astronomy is tottering, and is based upon many groundless assumptions. My experience of Cambridge is that sound mathematicians, who have considered this particular branch of science, are inclined to admit this,—at least those who are free from the trammels of certain modern societies, whose object now-a-days seems to be, not to elicit truth, but to keep people's minds in darkness.

"Renewing my thanks, I have the honour to remain, &c."]

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NOTE A. (§ 21.)

THE VELOCITY OF LIGHT: ITS "ASTRONOMICAL DATA" AND "EXPERIMENTAL PROOF."

The following correspondence may be read with interest, especially considering that another edition of Mr. Chambers's *Handbook* has recently issued from the Clarendon Press, Oxford :—

"Royal Institution of Great Britain,
"*November* 21*st*, 1863.

"Sir,—My attention has this day been directed to your *Victoria Toto Cœlo*, in which (p. 48) you do me the honour of a reference to my *Handbook of Astronomy* :—

"'How often have we been assured of the "certainty" and experimental confirmation of the old 192,000 miles per second as the velocity of light. (*Vide* Airy's *Lectures*, Worms's *Earth and its Mechanism*, Chambers's *Handbook of Astronomy*, &c., *in loc.*)'

"Two courses of comment suggest themselves on reading this passage —a personal and a general one. As regards the former, I think that in citing my remark as an exemplification of your own, you have unwarrantably laboured to make me the object of a gratuitous sneer, which I hereby complain of.

"If you will read again the passage in p. 166 of my book, you will find that I have done nothing but *casually and incidentally* advert to a statement which (though I believed it) it was no part of my province as an astronomer to discuss critically. Any person reading what you have said, without being acquainted with the original, could scarcely fail to infer that I was a dogmatic pleader for the indisputable accuracy of the aforesaid figures ; whereas, so far as my opinion was concerned, I said next to nothing on the subject. I shall trust to your candour in a future edition either to modify the passage or to append a copy of this note.

"The general question is one which I can scarcely believe ought to be argued. Surely a physicist may make a mistake as well as any other man, and is entitled to a rehearing when he becomes possessed of more reliable results. For my own part, I entertain a high opinion of the value of Foucault's discovery, and you will find it adopted in my second edition, now in a forward state for issue early next year, the first being all but exhausted.

"I am, Sir, your obedient servant,

"J. Reddie, Esq. "G. F. CHAMBERS.

"P.S.—If you will point out any *real* errors in my book, you will be conferring a favour equally on the public as on myself."

[*Answer to the above Letter.*]

"Bridge House, Hammersmith, W.
"*November* 26*th*, 1863.

"Sir,—I have delayed answering your letter of the 21st inst , in order to ask some friends whether they could discover anything either 'unwarrantable'

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or 'sneering' in the few words you quote from *Victoria Toto Cœlo; or, Modern Astronomy Recast*, where I refer to your *Handbook*. I am glad to say they do not; nor can I. I regret, of course, that you think yourself aggrieved, and shall cheerfully comply with your request to append a copy of your letter in a future edition. I shall also, so far as I can, make the contents of your letter public where my own book is likely to be known.

"I may venture to observe, however, that there is nothing in your work to show that you were not prepared to maintain the accuracy of the so-called 'experimental proof' of the old velocity of light to which you made allusion; and I profess I do not understand on what grounds you can now 'entertain a high opinion' of those experiments—which, as I have shown (pp. 38 and 48 of *Vict. Tot. Cœlo*), have been cited as *proving*, till lately, 'within the 77-millionth part of a second,' that the velocity of light was 192,000 miles per second, and more recently (by Mr. Hind) as *proving* it now to be only 185,170 miles per second! Perhaps you will afford the public some explanation of this in the second edition of your own work.

"As regards your remark that 'the general question is one which you can scarcely believe ought to be argued'! I confess it puzzles me; especially when read in connection with your P.S. In my opinion the greatest injury is done to science, in the present day, by what deserves no other name than scientific credulity; and the general public are, in fact, imposed upon by *quasi* facts in science being readily taken for granted and repeated (merely because 'believed') in books of scientific pretension, by one author after another, without the question of their real accuracy or error being ever argued.

"You could scarcely have read through *Victoria Toto Cœlo* when you wrote, or you would scarcely have asked me 'to point out any *real* errors in your work'! Some months ago I sent you a copy of *The Mechanics of the Heavens* (which, though not acknowledged, was not returned through the Post-office), and it draws attention to some facts, bearing on the general question, which affect the whole basis of your *Handbook*, so far as Physical Astronomy is concerned. When you have read, also, my *Victoria Toto Cœlo*, you will find I have not shrunk from pointing out to the public the innumerable errors and absurd contradictions that are now professed to be believed by astronomers, and which are to be found repeated in your *Handbook*, as in other popular works.

"If, however, you will direct my attention to anything in your book not to be found in other works, and which you *are* prepared to defend as accurate, I shall certainly devote special attention to it publicly, whether it agrees or disagrees with anything I have publicly advanced.

"I am, Sir, your obedient servant,

"GEORGE F. CHAMBERS, Esq. "J. REDDIE.
&c. &c. &c."

"The passage quoted by Mr. Chambers is a foot-note having reference to the words in italics contained in the following extract from Mr. J. R. Hind's letter to the *Times* of 17th September, 1863, in which he states some of the consequences of the sun's mean distance from the earth having been recently reduced from 95 millions to 91 millions of miles;—the principal parts of which letter are given in *Victoria Toto Cœlo*; viz.:—

"'The earth's mean distance becomes 91,328,000 miles, being a reduction of 4,036,000. The circumference of her orbit 599,194,000 miles, being a diminution of 25,360,000. Her mean hourly velocity 65,460 miles [instead of 68,000]. The diameter of the sun 850,100 miles, which is smaller by nearly 38,000. The distances, velocities, and dimensions of all the members

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of he planetary system of course require similar correction . . . . in the case of Neptune . . . . about 122 millions of miles. *The velocity of light is decreased by nearly* 8,000 *miles per second, and becomes* 183,470 *if based upon astronomical data alone'* (p. 48).

"The 'astronomical data' upon which the velocity of light has been long given out by astronomers as 192,000 miles per second, are (1st) the diameter of the earth's orbit, depending upon its distance from the sun; which distance is stated in Mr. Chambers's Handbook (as in other astronomical works) to 'have been ascertained *with great accuracy* from the transit of Venus in 1769', and (2nd) 'the difference in the time of the eclipses of Jupiter's satellites when the earth was at its greatest [and least] distance from Jupiter, namely, 16′ 26″ = 190 millions miles (diam. of earth's orbit) = 192,000 miles per second.'—(Handb. of Ast. *in loc.*)

"On page 38 of *Victoria Toto Cœlo*, referring to the *instantaneous coincidence* of some bright appearances on the sun's disk with certain magnetic disturbances on the earth (alluded to in Sir William Armstrong's address to the British Association), the following passage occurs :—

"'I would first beg to observe, that we seem to have an indication here, that electric or magnetic forces and light, probably travel with identical velocity. This is important in connection with Professor Wheatstone's interesting experiments with the "rotating mirror" as to the velocity of electricity, afterwards applied by Foucault to measure the velocity of light. Mr. Hind has quoted, in his letter to the *Times* of 17th September, 1863, the results of M. Foucault's experiments as confirming the *reduced* velocity of light, following from the newly reduced diameter of the earth's orbit. He says :-

"'M. Léon Foucault, of Paris, has succeeded in measuring the absolute velocity of light by means of the 'turning mirror,' an experimental determination of no little interest and significance. He concludes that it cannot differ much from 298,000,000 of French metres per second, or 185,170 English miles, which is a *notable diminution* upon the velocity previously derived from astronomical data alone.'

"But some years ago, Professor Helmholtz wrote of these same experiments, *when the velocity of light was believed to be* 192,000 *miles a second*,—

"'We have thus determined in a distance of twelve feet no less than the velocity with which light is propagated, *which is known to be nearly* 200,000 *miles a second;—the distance mentioned corresponds, therefore, to the 77-millionth part of a second.*'

"'At that time, it will be observed, the experiments with the rotating mirror were said to accord with the velocity derived from the then existing 'astronomical data,' *without* any 'notable diminution !'" (p. 38).

"I will only add that there has been a significantly marked silence, on the part of some journals that call themselves 'scientific,' as regards Mr. Hind's important letter to the *Times*. They almost entirely ignored it; and it is whispered that its publication has given offence in 'scientific' quarters. Heaven help us, if 'science' is thus to demean itself in the nineteenth century, in England! But, to quote once more, 'Neither the British press nor public have any vested interest in error.' . . . . 'Unquestionably, science is honoured and credited in the present day, as perhaps no religion, even, ever was. But it should be remembered by 'men of science' that the worship is sincere. What is thus credited is credited *as truth;* and if that is suppressed, ignored, or tampered with, the injury done to true science by those who ought to have been its guardians, will never be forgiven.' (*Vict. Tot. Cœl.*, pp. 41, 51.)

"J. R.

"*November 30th*, 1863."

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NOTE B. (§ 22.)

The Direction of "Solar Motion in Space."

Mayer, it will be observed, could not find that the proper motions of the stars afforded evidence of the motion of the solar system towards any particular region of the heavens; and he therefore rationally disbelieved in such solar motion. The advancement of science in our day has enabled some people to get over such a difficulty with ease. A clever correspondent of the *Times*, who frequently writes on scientific matters, with the initial "Y.," thus wrote in that journal on 15th September, 1863:—

"The whole of the solar system seems to be travelling—some report at the *slow rate* [*sic*] of 47,000 miles an hour—towards an *unknown region* of infinite space."

But the most curious thing that has ever appeared on the subject, has been put out by Lieutenant Morrison, R.N., in his *Astronomy in a Nutshell*, in which he claims to have demonstrated the sun's velocity to be "1,665 miles in a minute, or very nearly 100,000 miles an hour." But he has made even a stranger discovery than "Y." in the *Times*; namely, that this motion is neither towards the left arm of Hercules (as the "orthodox" believe), nor to the "unknown region" of "Y.," but precisely to the west! not considering that *the west*, as a point in space, is even more mythical than an unknown region, inasmuch as it is a direction that is *known to be ever varying!* The direction that is *west* to us at mid-day is—if the earth goes round, towards precisely the opposite point in space at midnight! And, whether the earth rotates or not, when we and our antipodes look towards the conventional *west* at the same time—at this present moment, for instance—we are looking in as directly opposite directions in space, as if we stood back to back! If Lieutenant Morrison's discovery were a real one, it would only be the discovery of the true rate of velocity with which the sun moves westwards *round the earth!*

NOTE C. (§ 23.)

Correspondence with Professor Airy.

Bridge House, Hammersmith, W.
June 6th, 1864.

Sir,—I beg leave, with the greatest respect, to call your attention to §§ 6, 57-63, and pp. 41–45, of the accompanying book (*Victoria Toto Cœlo; or, Modern Astronomy Recast*), relating to the motion of the moon. I venture to do so on three grounds: (1) In the interest of scientific truth, because of your eminent position as Astronomer Royal of England; (2) Because in the book referred to,—the text of which is a paper submitted by me to section A of the British Association last August,—I especially assailed as untenable the notion of the solar system in space; and having been the first and I believe only person who has done so, since the speculation was originally put forth by Sir William Herschel eighty years ago, I hailed with extreme satisfaction, and as a triumphant comment upon the dumb contempt with which my paper was treated by Professor Rankine and the committee of Section A, at Newcastle, the subsequent announcement contained in the last

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Annual Report of the Council of the Royal Astronomical Society, and published in the *Monthly Notices* for February last, that—"strange as it may appear," and notwithstanding the recent re-verification at the Royal Observatory of all the parallactic calculations hitherto supposed to justify the theory of the sun's motion,—you, Sir, had arrived at the conclusion, "that the whole question of solar motion in space, so far at least as accounting for the proper motion of the stars is concerned, appears to remain at this moment in doubt and abeyance"; but (3) I now venture mainly to address you, because I am about to write another paper intended to be hereafter published, elaborating more minutely and discussing more rigidly than before, the glaring fallacies, dating from the time of Newton, relating to the motion of the moon, which are briefly alluded to in the passages of *Victoria Toto Cœlo* to which I have ventured to direct your attention; where you may observe I have frequently cited your admirably lucid *Six Lectures on Astronomy*, in justification of what I have advanced as to current views.

I have taken the liberty to refer you to the printed matter in my book (the citations from which only occupy a few pages and will be more easily read than MS.) that I may thus be enabled to shorten this letter; having now only further to acquaint you,—which I do as a duty and an act of courtesy towards you,—that finding nothing so distinct and clearly enunciated elsewhere on this subject, as in your *Six Lectures*, I shall write with special reference to one or two passages in them; and these I will now point out, with a brief indication of the nature of the issues I intend to raise.

I think this course the more proper on my part, as I am not unmindful that these lectures were originally delivered to a mixed audience in the country, though they appear to have been subsequently revised for publication—the preface to the 4th edition, which I shall cite, being dated from the Royal Observatory.

In p. 176 of the lectures (fig. 56), it may be considered we have the working out of Prop. iv., Theor. iv., of Newton's *Principia*, b. iii., and what constitutes the unfortunately false basis upon which the famous "Problem of the Three Bodies" has invariably been solved. I may briefly observe, that my primary argument against this, and the main principle of all my reasoning, will be that the physical or dynamical laws of astronomy can only deal with the real or absolute motions of the heavenly bodies,—*not* with mere relative or apparent motions,—and that the real motions of the moon, both as regards velocity and path, are utterly disregarded in these propositions.

In p. 177 of the Lectures, the real motions of the moon being thus disregarded, her velocity is represented as only equal to 0·6356 of a mile in $1'' = 2{,}288$ miles an hour (or 2,290 miles, as given in Ferguson's Astronomy). I object, that on the heliocentric hypothesis, taking the radius of the earth's orbit as = 95 million miles, and its mean motion as 68,000 miles an hour (as in the Lectures), then the moon's motion is thirty times greater than above represented; the motion of the moon being, in fact, upon the whole, greater than that of the earth.

The "circumference of the moon's orbit" is in the same place spoken of (as if it described a circular or oval path each lunation) and represented as only 1,500,450 miles in a month; whereas the moon's real path in a month is only an undulatory curve, crossing and re-crossing an arc of between one-twelfth and one-thirteenth part of the orbit of the earth, and, in round figures, is thirty times greater than represented, or equal to more than 45,000,000 miles in a month. Every part of the reasoning based upon the moon's fictitious "orbit" round the earth as a fixed centre, both as to the moon's angular velocity, the direction of its motion, and its fall from the tangent (as well as the force of gravity thence deduced), is consequently

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fallacious, unless the hypothesis that the earth goes round the sun is abandoned.

Again, on p. 184 of the Lectures, and in fig. 59, the whole argument is only tenable if based upon the hypothesis that the earth is stationary, and the moon moving in an oval "orbit" round it every month. In §§ 60–63 of *Victoria Toto Cœlo* will be found a sketch of the line of reasoning to be adduced against this.

On p. 185 of the Lectures an allusion is made to what is previously advanced at pp. 85–87, to which I should not at present have cared otherwise to advert; but I cannot help considering that what is there stated can scarcely have been stated intentionally, and I have no wish to take advantage in argument of what it would appear may have been an oversight. In *Vict. Toto Cœlo*, § 11, I have pointed out that the motion of the moon in the *quasi*-ellipse, in which she has thus been represented to move, is in certain respects unlike the elliptical motions of the other heavenly bodies; the moon's motion being described as least at the apsides of her orbit, where the curvature is greatest, and greatest when in syzygy where the curvature is least. This —which is *not* the case, however, as regards the hypothetical ellipses described by the planets and comets round the sun—is nevertheless stated to be so (and it is even repeated) in the Lectures. For instance (p. 86) it is stated, "The greater its (the planet's) speed, the less its path is curved," referring to K in fig. 30, where the curvature is obviously greatest, the planet being then in perihelion, and moving round the lower focus of the ellipse with its greatest velocity.

In p. 85 of the Lectures, and the same figure (30), I regret that I may also be obliged to point out, that the tangential velocity or "force," "that part" ["of the force"] "which acts in the direction OM parallel to the orbit," is said to "accelerate the planet's motion in its orbit." But in "resolving the force MS into two, NM and OM," an unusual and unreal element is introduced into the demonstration. According to the first and second propositions of the *Principia*, and the ordinary methods of exhibiting the effects of centripetal forces, MS, the central force, is—besides OM, the tangential velocity—the only force affecting the body *ex hypothesi*. NM is therefore purely fictitious, and could only have been real, had the orbit (instead of an ellipse) been a perfect circle, when NM would have been merely SM, the *radius vector*, produced beyond the circumference of the orbit; in which case, also, there would be no "accelerative force," as the circle would be described with a uniform velocity. I point out this for the sake of accuracy and *ad hominem* only, not as myself adopting *any* mode of demonstration that would seem to prove that gravitating bodies could ever revolve either in circles or ellipses round centres of attraction; which I affirm, and claim to have proved elsewhere, to be demonstrably impossible.

To revert to the motion of the moon. I will only further trespass upon your time by observing that when the moon is in conjunction, and when (as stated in the Lectures) the sun's attraction upon it is greatest, it is precisely then (the moon's real path being regarded) that the moon begins to move away from the sun *with increasing velocity, as if repelled.* It is also when the moon as it were has dipped within the earth's orbit, between her last and first quarter, and when nearest the sun in conjunction, that her real motion is necessarily slowest, for then she ultimately falls behind the earth's motion in its orbit; and it is only when she rises beyond the earth's path, between her first and last quarter, and when her distance from the sun is greatest in opposition, that her motion is greatest; in other words, the reverse of what is stated in the Lectures, and of what may appear when a fictitious elliptical path is constructed for her, as with the earth at rest in its centre; also the reverse of what would result were there really an attractive influence exer-

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cised upon her by the sun. And, not only so, but the very direction of her motion is also reversed by this fictitious hypothesis, as exhibited in fig. 59 of the Lectures. Every astronomer must know that the moon's real motion is always *direct*. (Vide *Ferguson's Astr.*, *in loco.*) In fig. 59 of the Lectures her path is represented as *retrograde*, when in conjunction and between her last and first quarter; as going, in short, at the rate of 2,288 miles an hour to the right, in a path greatly curved and convex to the sun, when in reality she is moving to the left, in a totally different curve, which is concave to the sun, and then she is so moving with thirty times greater speed than the 2,288 miles an hour assigned to her in the Lectures.

I had the honour to forward to you, in 1862, a paper entitled *The Mechanics of the Heavens* which I had that year laid before the British Association at Cambridge; in § 11 of which paper, and the foot-note p. 6, I have expressed all I care to say as regards the difficulty, which I am quite aware there often is, in obtaining a hearing from eminent men like yourself for communications such as this. I beg leave only to add that I, nevertheless, think it a duty, from which I will not shrink, and also an act of courtesy on my part, to send you this letter, whatever may be its reception. But should I be favoured with any answer, I would beg that, whatever may be its nature, I may be permitted to publish it along with what I have now, most respectfully though freely, ventured to address to you as the Astronomer Royal of England.

I have the honour to be, Sir,

Your very faithful, humble Servant,

J. REDDIE.

To George Biddell Airy, Esq., F.R.S., F.R.A.S., &c. &c.,
Astronomer Royal, Greenwich.

P.S.—To save you all unnecessary trouble, should you now be pleased to bestow any attention on this matter, I shall forward by book post, along with *Victoria Toto Cælo*, another copy of *The Mechanics of the Heavens*, and also of *Vis Inertiæ Victa; or, Fallacies affecting Science*, which is frequently referred to in both the others, as it is probable you may not have cared to preserve those previously forwarded to you.

[*Answer to the above Letter.*]

Royal Observatory, Greenwich, London, S.E.,
June 7th, 1864.

Sir,—I am obliged by your courtesy in sending me three pamphlets, and by the trouble which you have taken in your letter of June 6, in indicating certain points to which you wish to call my attention.

I cannot at any length enter into the matter; but I will merely observe that much of what you say is quite correct, but that the difficulties which you have founded thereon are incorrect. It *is* true that the earth and the moon are two independent planets circulating round the sun, but under circumstances which make their perturbations excessively large, so large as to give the appearance or relative fact of the moon circulating round the earth. It *is* true that the moon as a planet has the large velocity round the sun of which you speak. But it is *also* true that, inferring relative forces from the difference of absolute forces (which on mechanical principles is perfectly correct), and inferring relative motions from the difference of

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absolute motions (which on geometrical principles is necessarily correct) there is no error in treating the moon as describing an ellipse round the earth, perturbed by the difference of sun's force on earth and on moon ; and there is no error in speaking of the moon's relative velocity round the earth as the small velocity in such an ellipse.

The failure in your reasoning is simply the want of the steps for inferring relative force and relative motion from absolute force and absolute motion ; and this seems to go through the whole.

You can perhaps understand that, as a very closely occupied man, I cannot enter further into this matter.

I am, Sir,

Your obedient Servant,

G. B. AIRY.

To JAMES REDDIE, Esq.

[The Reply to this letter is not inserted, as its substance will be found in the paper *On the Motion of the Moon*, Note D.]

NOTE D. (§§ 2, 31, 33.)

The Paper alluded to in the text as submitted to Section A of the British Association at Bath, in August, 1864, having been referred to two of our Vice-Presidents, Mr. Mitchell and Dr. Thornton, is now here printed upon their recommendation, with the approval of the Council of the Victoria Institute, that it may be discussed along with the foregoing Paper, should any prefer doing so. It is as follows :—

ON THE MOTION OF THE MOON, AND THE SUN'S REPULSIVE INFLUENCE, AS THE PROBABLE CAUSE OF THE VARIATIONS OF THE MOON'S MOTIONS, &c.

1. THE time which the moon occupies in passing through the shadow of the earth during an eclipse is, roughly speaking, four hours ; and—taking the earth's diameter at 8,000 miles, and assuming the breadth of the earth's shadow, plus that of the moon's disk, to be the same as the breadth of the earth itself,—it has hence been deduced, that the moon in passing through the earth's shadow is moving at the rate of 2,000 miles an hour : so, calculating her path for a day or for a month of thirty days at the same rate, we have 48,000 miles as the extent of her daily path, and 1,440,000 miles as her path during each lunation. These figures and calculations, however, are only approximative. The moon's velocity is stated by the Astronomer Royal of England, in his well-known *Six Lectures on Astronomy*, to be more precisely 2,288 miles an hour, and her path each lunation 1,500,450 miles ; and even in old works on Astronomy, such as Ferguson's, it will be found that the velocity of the moon is given as "about 2,290 miles an hour."

2. From the same simple data, the moon's mean distance from the earth has been deduced. Assuming her path in a month to be a circle of 1,500,450 miles in circumference, we have only to divide these figures by 3·1415...(the well-known ratio of the diameter to the circumference of

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a circle), and again by 2,—which will give us a semi-diameter or radius of 238,800 miles,—in other words, the moon's mean distance,—as we find it stated in Professor Airy's *Six Lectures*.

3. It is and has long been usual, however, to speak of the moon's distance from us, in round figures, as about 240,000 miles, or as 60 semi-diameters of the earth; which is thus arrived at:—She passes through the earth's shadow when eclipsed in four hours, and is therefore considered as describing the breadth of the earth or 8,000 miles in that time. Consequently in one day (or six times four hours) she describes six times the breadth of the earth; and taking thirty days as representing the period of each lunation, the moon will describe 6 times 30, or 180 times, the breadth of the earth in a month. One-third of this will be the diameter of her orbit, namely, 60 diameters of the earth, and she is consequently distant from us 60 semi-diameters of the earth, or 240,000 miles.

4. We find this mode of computing and speaking of the motion, and path, and distance of the moon, in the most modern astronomical works. I have made use of the *ipsissima verba* of the present Astronomer Royal, taken from the fourth edition of his Lectures. But it is by no means a merely modern view. It dates back far beyond our own day or even the time of Newton, Kepler, or Copernicus. In fact, it really belongs to the Ptolemaic system; and it rightly belongs to it; for it will be found, upon due consideration, that in all respects the deductions which have been drawn from the one initial fact of observation, that a lunar eclipse lasts about four hours, depend for their approximate accuracy upon a geocentric hypothesis, with the earth at rest in the centre of the moon's orbit.

5. According to Ptolemy and other astronomers about his time, the moon was regarded when *in syzygiis*, that is, when in conjunction with and in opposition to the sun, or when dark and full, as distant from us 59 semi-diameters of the earth. Huygens regarded its distance as 60 semi-diameters, Copernicus as $60\frac{1}{3}$, Street as $60\frac{2}{3}$, and Tycho-Brahe (if we correct the error due to his peculiar theory of Refractions) as $60\frac{1}{2}$. In the *Principia*, B. III., Prop. IV., Theor. IV., the distance is taken as 60; which is the basis of Newton's original calculations of the force of the moon's gravitation towards the earth, measured by the fall from a tangent to the moon's circular orbit, described with this radius.

6. As regards Ptolemy and others, who believed the earth to be at rest, their deductions as to the path of the moon in a month, in an orbit nearly circular round the earth, and consequently as to the extent of the moon's radius or mean distance, based upon the duration of a lunar eclipse, and the moon's consequent rate of motion, were necessarily very nearly accurate, if they were correct in the primary assumption that the breadth of the earth's shadow is nearly three times the breadth of the moon. To them, and upon the geocentric hypothesis, the velocity or rate of motion, and the monthly orbit of the moon in a nearly circular path, were real and actual. Not so, upon the Copernican system.

7. It is obvious, upon a moment's consideration—if we regard the earth as a planet in rapid motion round the sun, flying from west to east, or from right to left, with a velocity of 65,000 miles an hour, while the moon, when at the full, is moving in the same direction so swiftly that she passes through and beyond the earth's rapidly-moving shadow in the course of four hours—that the moon is really moving not at the comparatively slow rate of merely 2,000 miles an hour, but with an enormous velocity, 2,000 miles an hour swifter than the earth itself, that is, with a speed of no less than 67,000 miles an hour, during a lunar eclipse.

8. But the whole problem of the moon's motion and path is otherwise

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changed and complicated, by the hypothesis of the earth's revolution round the sun. On that hypothesis we may not longer simply take this rate of the moon's motion during an eclipse, namely of 67,000 miles an hour, and multiply it by 24 to give the moon's path in a day, and again by 30 to obtain her path approximately in a month ; because although, upon the data assumed, 67,000 miles is truly the velocity per hour of the moon when in opposition, it is by no means or approximately the rate of her whole motion during a lunation, as the rate of 2,000 miles an hour almost truly was upon the simpler hypothesis that the earth is at rest. Upon the heliocentric hypothesis, with the earth in rapid motion, and the moon passing round it while it thus moves, the moon must indeed travel 2,000 miles an hour more swiftly than the earth when at the full, and she must retain a greater velocity than the earth in order to get before it and arrive at her place in her last quadrature ; but it is equally a necessity of the hypothesis, that when there her velocity must diminish to less than that of the earth, that she may fall back to her place in conjunction between the earth and the sun, and that she must continue to move with a velocity less than the earth till she falls behind the earth in its orbit, and so reaches her place in her first quarter ; so that, just as the moon required to travel at the rate of 67,000 miles an hour, or 2,000 miles faster than the earth, in order to pass through its shadow in four hours when in opposition ;—so when she is in conjunction, and falling behind the earth as much as before she exceeded it in velocity, her rate of motion must become reduced to 63,000 miles an hour, or 2,000 miles an hour less than that of the earth.

9. Thus we see, that upon the geocentric system, the moon's motion, computed from the duration of a lunar eclipse, was very nearly at a uniform rate of about 2,000 miles an hour ; but, from precisely the same data, when we change the hypothesis, and assign to the earth a mean orbital motion of 65,000 miles an hour, then the moon's velocity must of necessity vary during each lunation no less than 4,000 miles an hour, her speed, when she is full or in opposition to the sun, being 67,000 miles, and when she is dark or in conjunction with the sun, 63,000 miles an hour only. Reasoning from the same one initial fact of observation, namely, that during a lunar eclipse the moon traverses the earth's shadow in about four hours, I repeat, that upon the geocentric hypothesis the moon's real motion is very little more than 2,000 miles an hour throughout, and is nearly the same in every part of her orbit, the variation being comparatively slight ; while upon the heliocentric hypothesis her mean velocity is not only increased by the whole velocity of the earth in its orbit, but it actually becomes 4,000 miles an hour greater and less at one time than another. The moon's real velocity during a lunar eclipse, and always when she is full and furthest from the sun, upon the heliocentric hypothesis, is no less than 4,000 miles an hour greater than it is at the time of a solar eclipse, and always when she is nearest the sun immediately before new moon. This great variation in her velocity also occurs, though her distance from the earth is supposed to be nearly the same at these two times.

10. But not only is the rate of the moon's real motion thus altered, and its comparatively uniform motion changed, so materially as to differ by no less than 4,000 miles an hour at one time and another each lunation, when we abandon the Ptolemaic system, but the actual path of the moon is also entirely altered, and the very direction in which she moves is thereby changed, and even at times reversed. She no longer describes a nearly circular or oval path both in space and round the earth every month, at a radial distance of less than 240,000 miles, but she moves in an enormously larger orbit with a radius some 380 times greater ; and this nearly circular orbit she now describes, not monthly round the earth, but round the sun once a year. Then her path during each lunation, though she still

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appears to move in a circle round the earth, is no longer really a circle, but a slightly irregular arc, crossing and re-crossing, and nearly corresponding with an arc of about 30° of the earth's annual orbit round the sun. The moon's apparently circular monthly orbit round the earth is now but a mere appearance, resulting from her varying velocities as she thus crosses and re-crosses the path of the earth, always moving with decreasing speed as she approaches the sun from full moon till she is in conjunction, and always increasing in velocity as she recedes from the sun between new moon and till she is full; her velocity being always least while she dips within the orbit of the earth, and greatest when she is moving outside, or beyond the earth's orbital path.

11. I call attention to these details and dwell upon them, not as advancing anything that is absolutely new,—though I know they will appear as such to many, but because they have been too much or altogether disregarded, and have not been duly weighed, nor truly represented, in the explanations or interpretations of the phenomena of the moon's motion hitherto put forth, and now generally accepted.

12. Some, at least, of these facts as to the moon's real path and varying velocities will be found recognized in the following passages, which I cite from the ninth edition of Ferguson's well-known work on Astronomy. Having drawn a diagram to scale of the earth's and moon's relative paths in their respective orbits round the sun, he says :—

"Thus we see that, although the moon goes round the earth in a circle with respect to the earth's centre, her real path in the heavens is not very different in appearance from the earth's path. . . . The moon's absolute motion from her change to her first quarter is so much slower than the earth's, that she falls 240,000 miles (equal to the semi-diameter of her orbit) behind the earth at her first quarter; that is, she falls back a space equal to her distance from the earth. From that time her motion is gradually accelerated to her opposition or full, and then she is come up as far as the earth, having regained what she lost in her first quarter. From the full to the last quarter her motion continues accelerated, so as to be just as far before the earth as she was behind it at her first quarter. Afterwards her motion is retarded, so that she loses as much with respect to the earth as is equal to her distance from it. . . . Hence we find that the moon's absolute motion is slower than the earth's from her third quarter to her first, and swifter than the earth's from her first quarter to her third, her path being less curved than the earth's in the former case, and more in the latter. Yet it is still bent the same way towards the sun," or (as he again shows by the diagram drawn to scale) "is concave to the sun throughout." (§§ 266, 267.)

13. These brief citations from Ferguson's Astronomy show, that the hypothetical facts to which I appeal, have been substantially recognized by astronomers, and are not really new, though they have been too much or almost altogether disregarded, and although what flows from them has been overlooked. As an instance of this, I beg leave to refer once more to the Astronomer Royal's *Six Lectures on Astronomy*. The author is speaking of the deceptiveness and frequent unreality of mere appearances, as regards rest and motion; and, arguing in favour of the heliocentric theory, he says :—

"The argument is precisely the same as applied to the heavens. If we had nothing but the sun and moon turning about in various ways; even then, remarking their great size and their great distance, and the great speed with which they must be supposed to turn *(for the moon must be supposed to move at the rate of* 60,000 *miles an hour*, and the sun very much quicker), their daily revolution round the earth would be very unlikely." (4th ed, p. 54.)

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Here we see that the actual motion of the moon, which has, of necessity, upon the received hypothesis, a velocity of more than 65,000 miles an hour, is not only disregarded or forgotten; but, that the moon should require to move with any such great velocity, is even made an argument against the probability of the Ptolemaic system,—though the facts, and consequently the argument as regards the moon's motion, computed from the duration of an eclipse, upon the two rival hypotheses, are precisely the other way. It is only, as we have already seen, if the earth be at rest that the moon can be regarded as passing through the earth's shadow at the approximate rate of 2,000 miles an hour;* whereas, upon the Copernican hypothesis, and regarding the earth's velocity in its orbit as 65,000 miles an hour, the rate of the moon's motion is actually, of necessity and *ex hypothesi*, even greater than the rate of 60,000 miles an hour, which was urged as so "very unlikely" as to amount to an argument against the Ptolemaic system!

14. But, not only has the real velocity of the moon been thus disregarded, —and in fact it is not only disregarded, but apparently denied, by the argument employed in the passage above cited, — but in no other part of these lectures is the moon's real motion or path even once mentioned. Its motion is exclusively spoken of as only about 2,000 miles, or more precisely as 2,288 miles an hour, in a nearly circular monthly orbit.

15. But, since in Ferguson's Astronomy the real path and rapid motions of the moon as she accompanies the earth round the sun, and also the great variations in her velocities at one time and another, are recognized; let us examine by what kind of reasoning or argument her actual velocities are practically set aside and become resolved into the small mean motion of only 2,290 miles an hour. It can scarcely be said that anything like adequate argument is attempted. What Ferguson says is solely directed to meet a single "difficulty," which alone appears to him to require to be removed. His words are:—

"The moon's path being concave to the sun throughout, demonstrates that her gravity towards the sun at her conjunction, exceeds her gravity toward the earth. And if we consider that the quantity of matter in the sun is almost 230,000† times as great as the quantity of matter in the earth, and that the attraction of each body diminishes as the square of the distance from it increases, we shall soon find that the point of equal attraction between the earth and the sun is about 70,000 miles nearer the earth than the moon is at her change. It may then appear surprising that the moon does not abandon the earth when she is between it and the sun, because she is considerably more attracted by the sun than by the earth at that time. But this difficulty vanishes when we consider, that

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* But, even upon a geocentric hypothesis, the rate of the moon's motion cannot be so very simply ascertained. The true solution of the problem will depend upon the breadth of the earth's shadow, the distance and size of the sun, and the motion of the earth's shadow in one direction or another; which will again depend upon whether the earth, if supposed to be at rest in space, has an axial rotation or not, and whether the moon is moving faster than the sun in one direction, or slower than the sun in another. In fact, unless both the earth and the sun were at rest in space, the duration of a lunar eclipse, on either hypothesis, could not give precisely the rate of the moon's motion, even if we knew the precise breadth of the earth's shadow. If only the earth were at rest and in the centre, the duration of eclipses could only indicate the difference between the velocity of the sun and moon.

† Increased to 352,280 times, taking the earth's radius as 95,000,000 miles. (*Airy's Lects.*, p. 215.)

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a common impulse on any system of bodies affects not their relative motions ; but that they will continue to attract, impel, or circulate round one another, in the same manner as if there was no such impulse. The moon is so near the earth and both of them so far from the sun, that the attractive power of the sun may be considered as equal on both ; and therefore the moon will continue to circulate round the earth in the same manner as if the sun did not attract them at all. For bodies in the cabin of a ship may move round, or impel one another, in the same manner when the ship is under sail, as when it is at rest; because they are all equally affected by the common motion of the ship." (§ 268.)

16. Now, had I anything better to produce on that side of the question, I should have been glad to do so. Unfortunately the point is not discussed at all in the Astronomer Royal's lectures. Ferguson's reasoning is not only very poor and inadequate, but it is self-contradictory. He first says, that when the moon is nearest the sun, "her gravity towards the sun exceeds her gravity towards the earth" ; and he even repeats, that "she is considerably more attracted by the sun than by the earth at that time" ! But he afterwards says, that "the moon is so near the earth, and both of them so far from the sun, that the attractive power of the sun may be considered as equal on both ; and therefore that the moon will continue to circulate round the earth as if the sun did not attract them at all" ! The best answer I can give to this is the following words of the Astronomer Royal. He says :—"The sun by the law of gravitation attracts bodies which are near with greater force than those which are far distant from it. Therefore, when the moon is nearest the sun, the sun attracts the moon more than the earth, and tends to pull the moon away from the earth" (p. 184). He afterwards clearly points out that it is only when the moon is in quadrature that the sun's attraction upon her and the earth is nearly the same, as they are then both equidistant from it.

17. But, unfortunately, while Ferguson is arguing upon these false notions as to the force of gravity, and with questionable logic throughout, though very properly with reference to the actual path of the moon on the heliocentric hypothesis, Professor Airy does not apply his sounder reasoning as to the sun's attraction to the real motion of the moon at all, but only to her *quasi* "motion" in an unreal circular path round the earth as a centre at rest. As he thus, when the moon moves slowest, has reversed the real direction of her motion between her quadratures, he by that means shows that the sun's increasing attraction increases the moon's velocity from her last quadrature as she is approaching nearer the sun to her place in conjunction ; which is directly contrary to the fact that the moon then really decreases her speed till nearest the sun, where she moves with her least velocity. It is in this manner alone he arrives at the following conclusion :—"Therefore, when the moon is *nearest the sun*, and furthest from the sun, she is moving with the greatest velocity" ; which could only possibly be true were the earth at rest.

18. Ferguson's other argument is as follows :—"But this difficulty vanishes when we consider that a common impulse on any system of bodies affects not their relative motions, but that they will continue to attract, impel, or circulate round one another, in the same manner as if there was no such impulse. For [he argues] bodies in the cabin of a ship may move round, or impel one another in the same manner when the ship is under sail and when it is at rest, because they are all equally affected by the common motion of the ship."

19. If Ferguson, or any other persons who have made use of this illustration, had only carefully considered what is the cause or reason why all bodies in the cabin of a ship are necessarily affected by the motion which is truly

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described as being "common to all," while they may move among one another from other causes, they could scarcely have relied upon it as furnishing an argument applicable to the relative motions of detached and independent bodies like the earth and moon. All bodies in the ship are somehow attached to it, whether they stand or move about, while they are supported from below, or whether they hang and are swung about while they are supported or suspended from above. They partake of the common motion of the ship, because they are attached to it mechanically. Therefore, let us vary the illustration; for it is a fact that men have been influenced by popular arguments upon this question much more than at first may be supposed.

20. Let us suppose, then, that we are in one of the carriages of a railway-train, travelling eastward at the rate of 40 miles an hour, and that we overtake another train on a parallel line of rail moving also eastward at 35 miles an hour. When we pass that train, it will lag behind ours, and so it will appear to move away in an opposite direction. But would we, therefore, be entitled to reason as if the other train were really moving westward at the rate of five miles an hour; and—which follows as a necessary consequence of our doing so—to speak as if our own train were at rest, though we know the facts to be that both are travelling eastward, only that ours is moving quickest, with a velocity of 5 miles an hour greater than the other? Observe the result if we do. The train that is moving fastest must be regarded as not moving at all, and the other as moving in a direction opposite to its actual motion; and then, also, the slower it moves, the greater its velocity will appear: the direction of the motion and the rate of velocity being both reversed and made contrary to reality.

21. Or, again, were we in the slower train, would it be rational to speak of the greater velocity of the passing train as only a speed of five miles an hour, and regard our own train as at rest? In that case, it will be observed, the mere appearance is not so utterly contrary to fact as in the other. As it is now the slowest train that is considered at rest, the direction of the motion of the other is not reversed; the delusion is limited to the rate of the velocity.

22. But, if it would be absurd to do this, when we merely consider the directions of the motions and the relative rates of velocity of the two trains, it would, if possible, be even more absurd, if we were further to reason from the mere appearances, as to the probable motive power, or force, which had produced the motions and respective velocities of the two trains. If the conversion, for instance, of one ton of fuel into heat represented the force that would produce a speed of one mile an hour for a given time; and in like manner thirty-five tons a speed of thirty-five miles, and forty tons of forty miles an hour; then, founding our calculations upon the mere appearances, instead of the real motions, would lead us to astounding conclusions.

23. One other illustration will suffice. Suppose there is a steam-vessel with a single mast, floating at rest on a placid sheet of water, without any current and with no wind; and at a little distance, that another smaller steamer is lying parallel and attached to the larger vessel by a rope looped round its mast. Then let us suppose the small steamer gets up steam, and begins to move eastward with a horse-power equal to propel it two knots an hour. The result will be that the small vessel will not steam forward in a straight line, but it will move round the larger vessel to which it is held attached by the rope. Although the rope does not draw the smaller vessel towards the larger, yet as it holds it at the distance of the rope's length, and so causes it to move round,—an illustration like this has been often used as representing the revolving of a body held to a centre by gravity. Ferguson, among others, does so, in § 107 of his Astronomy: his illustration being a boat rowed by a man while attached to a stationary ship by a rope. But he

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only applies the illustration to the case of the earth and planets, as revolving round the sun at rest. Adopting this illustration *quantum valeat*, let us now apply it to the motion of the moon round the earth as a moving centre. We have now only to suppose that our larger steamer also gets up steam, and begins to move eastward, say with a speed of twelve knots an hour, and watch the result. The little steamer being detached in one sense from the other—though it is attached to it in a different sense, *i.e.*, held by a rope at a certain distance detached from it—does *not* partake of the motion of the larger vessel, as all bodies in its cabin and on its deck do, as in Ferguson's previous illustration (§ 18, *ante*). The little vessel, therefore, now falls behind, where it will be towed along ; the only effect of its exerting its steam power of two knots an hour being to lessen, *pro tanto*, the tension upon the rope that holds it. In order that the small vessel may now go round the other as before, and keep the rope always stretched out with the same tension, while the larger vessel now steams along at twelve knots an hour, it will require a horse-power sufficient to give it a speed of fourteen knots an hour in moving eastward, and when it has passed before and round to the other side of the larger vessel, it must then have reduced its speed to ten knots an hour, still however steaming in an easterly direction, or it could not make its apparent revolution round the other.

24. This illustration, however, would only be strictly analogous if the moon's motion in its apparent circular orbit were always the same ; which is not the case. If that were so, then the influence of the sun upon the moon's motion would be omitted as imperceptible or *nil*, according to the usual methods of dealing with this problem ; for it should be remembered that it is what is called "the *moon's variation*" (that is, *the variation* of her motions in her apparent orbit) that is attributed to the influence of the sun's attraction. Let us, therefore, leave illustrations, to reason from the actual facts of the case that is under discussion, which are perfectly clear of themselves, and really not in dispute. I admit the *apparent* increase of velocity in the motion of the moon as she approaches the sun ; and, were this apparent increase of velocity real, instead of merely apparent, I would further admit that it might be caused by the sun's attraction ; but what I maintain is, that if we believe in the Copernican theory, we also know quite well that this apparent increase of velocity as the moon approaches the sun is only apparent and unreal, being, in fact, the result of the moon's decreasing velocity when viewed from the earth as a stand-point. As the earth is, then, *ex hypothesi*, moving quicker than the moon, the moon merely appears to move quicker, and also to move in an opposite direction, contrary to reality, as we have seen is also the case in the simple illustration of the passing railway-trains. If we really believe the earth to be in motion, then we have only to take into account its velocity eastward, in order that the apparently increasing motion of the moon the other way may be known to be, in fact, a decreasing velocity in the same eastward direction ; and, consequently, if this variation of the moon's velocity is attributable to the influence of the sun, it follows that that influence must be *repulsive*, since it has really retarded the moon's velocity in approaching the sun. In like manner also, therefore, as the moon's motion, which is apparently retarded and decreasing from her place in conjunction till in her first quarter, is really increasing during that time, and goes on increasing more and more as she recedes from the sun till she reaches her greatest distance in opposition, the real influence of the sun upon the moon must be *repulsive*, or, the reverse of that, attributed to the sun, when only the apparent variations of her motion are considered, instead of the real variations, upon the Copernican hypothesis.

25. How this obvious oversight can have occurred is not the question. To say the least, it is certainly remarkable, when we consider that the very

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watchword of Copernicus and Galileo was virtually that appearances are deceptive. It seems to have been forgotten that if appearances are deceptive as regards the motion of the earth, they may be equally deceptive as regards the motions of the moon. The moon's variation, in fact, was first discovered by Tycho Brahe, who held a geocentric hypothesis, and who would naturally therefore speak of the moon's apparent increase and decrease of velocity as not only apparent but real, for so he believed them to be ; and so they would have been, if his geocentric hypothesis were true.

26. It is for us, however, now, whatever others may have done, to get rid of all unrealities and deceptive appearances in science. We are bound, as rational beings, if we accept a heliocentric system, to look at all its consequences. In some respects the puzzling motions of the moon may probably be better understood if we regard her actual path on that system. The moon's variation, the alteration of the place of her nodes, and the progression of the apse—probably, also, her annual equation, would, perhaps, all be more simply explained and better understood, by dealing with her actual motions and velocities, instead of fictions.* I do not say there will not be found other difficulties of another kind. But that is nothing to the purpose. We may not get over difficulties in science by having recourse to mere false appearances. For instance, there may be a difficulty from the non-coincidence of the moon's path with the plane of the ecliptic, as this will make her path not a simple undulatory wave-line crossing and recrossing the earth's orbit in the same plane, but a kind of drawn-out spiral path round the orbit of the earth. On the other hand, even this may be found a simplification that may serve to explain the apparent librations and some of the other various perturbations of the moon, so far as they may not be mere optical effects of changed position and varying refractions.

27. At all events we must not flinch from the consequences that flow from our adopted hypothesis. The opposite course has been far from satisfactory. With a heterogeneous mixture of effects which are only apparent in the moon's motions, explained by a physical cause believed to be real ; with a fictitious orbit never described by the moon if the earth revolves, in which, also, the very direction of her real motions is sometimes reversed, and, as a natural consequence, is accounted for by an influence which must really repel, mistaken for a force that attracts, we need not be astonished that the result has been perplexities and complications. "Of these applications of the theory of gravitation to explain the different perturbations of the moon" (says Professor Airy), "a great deal might be said. It is a subject involved in mathematical perplexity beyond anything else that I know" (p. 183). One of the latest of these perplexities is the famous dispute as to the acceleration of the moon's mean motion, described in Lord Wrottesley's Address to the British Association at Oxford in 1860. I allude to it now, because it certainly is one of those difficulties from which all that has been in dispute between several eminent analysts of England and the Continent, is entirely cleared away, when we have regard to the moon's real path round the sun instead of to a fictitious path round the earth. His Lordship said : "Professor Adams asserts that his predecessors have improperly omitted the consideration of the effect produced by the action of that part of the sun's disturbing force which acts in the direction of a tangent to

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* So also, the various phenomena of the tides may be more simply explained by the hypothesis of a repulsive influence than they are by the theory of the attractions of the sun and moon ; especially considering that there are *no tides* at the Equator, where the theory of attraction requires them (and Newton and his followers actually represent them) to be *greatest* !

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the moon's orbit, and which increases its velocity. His opponents deny that it is necessary to take this into account at all," and probably they did so with very good reason; for, at the opposite side of the moon's orbit, when represented as nearly a circle round the earth, there of course would be the same disturbing influence to act against the now precisely opposite direction of the moon's motion. But, if it had only been kept in mind that when the earth is regarded as in motion, the moon's real path is always concave to the sun, this dispute could never have been raised, for the simple reason that no tangent to the moon's orbit could then possibly be imagined in the direction of the sun!

28. It may be from forgetfulness such as this, and the inadvertent confounding together of real and relative and apparent motions, that (in the words of Professor Whewell) "the Copernican system itself is very complex, when it undertakes to account, as the Ptolemaic did, for the inequalities of the motions of the sun, moon, and planets; for," he adds, "even the moon's motion cannot be conceived without comprehending a scheme more complex than the Ptolemaic epicycles and eccentrics in their worst form." But, be that as it may, I now appeal to the actual facts of the moon's real path and her greatly varying velocities, upon the Copernican hypothesis, to establish one obvious truth, namely, that if these variations of motion are caused by the influence of the sun, the sun's influence upon the moon is inevitably *repulsive*.

August 12*th*, 1864.

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ADJOURNED ANNUAL GENERAL MEETING, JULY 12, 1869.

THE REV. DR. ROBINSON THORNTON, VICE-PRESIDENT, IN THE CHAIR.

Mr. REDDIE, Hon. Sec., read the Third Annual Report of the Council as follows:—

THIRD ANNUAL REPORT of the Council of the VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

Progress of the Society.

1. In presenting their Third Annual Report the COUNCIL of the VICTORIA INSTITUTE, while expressing their belief that the objects for which the Society was established have been materially advanced by the proceedings of the Session just closed, have still to express regret (as they did last year) that there has not been a greater accession of new Members and Associates.

2. Shortly after the close of the last Session, the Council deemed it advisable to terminate the engagement with the gentleman who then held the appointment of paid Secretary, and to elect Mr. W. H. S. Aubrey in his place. The account-books and papers, which had been unsatisfactorily kept by the former Clerk (whose discharge was mentioned in the last Annual Report), have now been carefully examined and put into proper order; and it is believed that the general business of the Institute will in future be conducted with due regularity and efficiency.

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3. The Council have the painful duty to announce the decease of the following:—

George Lowe, Esq., C.E., F.R.S., M.V.I., London.
Rev. J. I. Holmes, M.A., M.V.I., Exeter.
Joseph Jones, Esq., A.V.I., Belfast.
J. J. Lidgett, Esq., B.A., M.V.I., and Member of Council, London.

Finance.

4. The Balance Sheet for the year ending December 31, 1868, is appended to this Report, showing a balance in hand at the close of the year of £97. 12s. 11d.

5. The number of Members and Associates on May 1, 1869, and the estimated assets of the Society for the current year, were as follows:—

200	Members at £2. 2s. ...	£420	0	0
14	1st Class Associates at £2. 2s.	29	8	0
44	2nd Class do. £1. 1s.	46	4	0
258	Annual Subscribers	£495	12	0
22	Vice-Patrons, Life Members, and Life Associates (Dividends on Life Subscriptions invested; say)	10	0	0
280		£505	12	0

Since the 1st of May, however, eight Members and two Associates have been enrolled.

6. The Subscriptions in arrear have now been reduced to the following:—

	1866.	1867.	1868.
Members	4*	13	23
First Class Associates		1	1
Second ditto		4	7

7. The Council regret to have to add that upon an examination of the accounts kept by the former Clerk, it was discovered that various subscriptions received by him were unaccounted for; but a considerable portion of the amount has since been refunded, and will appear in the accounts for the year 1869, and the balance remaining due is

* Three of these have now been removed from the List of Foundation Members.

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promised to be paid immediately. The Council beg to express their extreme regret that, in consequence of these irregularities, several Members and Associates were put to the annoyance of receiving applications for Subscriptions which they had already paid, and that this led to several withdrawals from the Society. It was also discovered, on examination, that 14 Members and 2 First-Class Associates had withdrawn prior to the date of the last Annual Report, but whose names were omitted to be taken off the books for 1868.

8. A Finance Committee of the Council having been appointed to examine into the affairs of the Institute, they have made the following recommendations:—(1) That a further sum of £63 be invested in the names of the Trustees; and (2) That a standing Finance Committee be appointed; both of which recommendations will be carried into effect. The Committee also expressed satisfaction with the manner in which the Books and Accounts are kept by the present Secretary.

Meetings.

9. During the Session just closed fifteen Ordinary Meetings have been held; and the following is a List of the Papers read and discussed:—

Ethical Philosophy, and its Relations to Science and Revelation. By the Rev. W. W. English, M.A., M.V.I. (Read and discussed Dec. 7th and 21st, 1868.)

Some Uses of Sacred Primeval History. By Dominick McCausland, Esq., Q.C., LL.D., M.V.I. (Jan. 4th, 1869.)

The Relation of Reason to Philosophy, Theology, and Revelation. By the Rev. C. A. Row, M.A., M.V.I. (Jan. 18th.)

An Analysis of Human Responsibility. (Three Papers.) By the Rev. Dr. Irons, M.V.I. (Feb. 1st, March 1st, and June 7th.)

The Doctrine of Creation according to Darwin, Agassiz, and Moses. By the Rev. Professor Kirk, M.V.I. (Feb. 15th.)

The Noachian Deluge. By the Rev. M. Davison, M.V.I. (March 15th.)

Life—Its Origin: an Examination of some Modern Opinions. By J. H. Wheatley, Esq., F.G.S., Hon. Local Sec. V. I., Sligo. (April 5th.)

Man's Place in Creation. By Professor Macdonald, M.D. (April 19th.)

More than one Universal Deluge recorded in Scripture. By the Rev. H. Moule, M.A., M.V.I. (May 3rd.)

Certain Analogies between the Methods of Deity in Nature and in Revelation. By the Rev. G. Henslow, M.A., M.V.I. (May 10th.)

The Respective Provinces of the Observer and the Reasoner in Scientific Investigation. By the Rev. Edward Garbett, M.A., M.V.I. (May 17th.)

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The Credulity of Scepticism. By the Rev. Robinson Thornton, D.D., Vice-President. (Being the Annual Address, delivered on May 24th.)
Current Physical Astronomy. By James Reddie, Esq., Hon. Sec. V.I. (June 21st.)

10. The Council desire specially to call attention to the three valuable Papers on "Human Responsibility," read by the Rev. Prebendary Irons, D.D., which they have decided upon publishing separately at once, (without waiting for the issue of the Journals in which they will eventually appear with the Discussions thereon,) on account of their great importance as contributions to the literature of Moral Science; these Papers being peculiarly adapted to meet a want of the present time, and to counteract atheistic principles.

11. The Council once again urge upon intending Contributors of Papers the desirableness of having them prepared and sent in early, and, if possible, before the next Session commences; so that timely notice of Papers to be read may be given to the Members and Associates. Several most valuable contributions are already promised.

Publications.

12. Parts 9, 10, and 11 of the *Journal of Transactions* have duly appeared; and the Council trust that those numbers will be found to maintain the interest aroused by the earlier publications. Part 12, completing Volume III., is in the press, and will be issued early in August. Part 8, containing the Rev. Walter Mitchell's paper on Crystallography (the publication of which has been so long unavoidably delayed from various circumstances), is now expected to be shortly issued; thus completing Volume II.

Conclusion.

13. It will be seen from last year's expenditure in the Balance Sheet, that only by the exercise of the greatest economy can the working expenses of the Institute be defrayed out of the present estimated income for this year; and that there must be a considerable increase of members and of funds ere all the objects for which the Institute was formed can be attained. It is felt to be especially desirable to secure the advantages of a Reference Library and a Reading-room, with more convenient offices. A few interesting and valuable works have been presented to the Library during the year,

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and the Council would be glad to be able to congratulate the Members and Associates on the possession of a Library worthy of the Institute.

14. It is satisfactory to be able to add, in conclusion, that many gratifying proofs exist that the substantial work already accomplished by the VICTORIA INSTITUTE in the publication of so many valuable Papers and Discussions, is becoming better known through the Press, and is beginning to be better appreciated both by the clergy and by the general public. The Council would suggest to the present Members and Associates that they might with advantage point out to their friends that while the Society is most anxious to have an accession of adherents who are connected with literature, science, and philosophy, the Institute also requires the support of others as subscribers and as readers, in order to advance and extend its objects and operations.

Signed on behalf of the Council,

R. THORNTON, D.D, *Vice-President*,
CHAIRMAN.

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THIRD ANNUAL BALANCE SHEET, *from 1st January to 31st December*, 1868.

RECEIPTS.	£.	s.	d.
Balance from 1867—brought forward	78	17	2
Arrears of Subscriptions paid :—			
2 Life Members at £21	42	0	0
5 Members for 1866 at £2. 2*s.*	10	10	0
50 Members for 1867 at £2. 2*s.*	105	0	0
3 Entrance fees for 1867	3	3	0
6 Associates (2nd class) at £1. 1*s.*	6	6	0
	166	19	0
Current Subscriptions (1868) paid :—			
170 Members at £2. 2*s.*	357	0	0
14 Entrance fees at £1. 1*s.*	14	14	0
9 Associates (1st class) at £2. 2*s.*	18	18	0
27 Associates (2nd class) at £1. 1*s.*	28	7	0
	418	19	0
2 Members for 1869 at £2. 2*s.*	4	4	0
One Year's Dividends on £291. 11*s.* 10*d.* invested in New Three per Cent. Annuities	8	10	6
Sale of Journals	9	18	4
	£687	8	0

EXPENDITURE.	£.	s.	d.
Printing and Binding	237	16	6
Stationery and Books	24	12	6
Rent	55	0	0
Furniture	8	6	3
Salaries	147	10	5
Reporting	44	6	0
Postage of Letters, Circulars, and Journals, and carriage of parcels	32	10	6
Advertising	9	2	6
Refreshments and expenses of Meetings	22	12	0
Sundry Office expenses	7	18	5
Balance in hand	97	12	11
	£687	8	0

Examined with the books and vouchers,
and found correct,

JOHN J. LIDGETT, }
W. VANNER, } *Auditors.*

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Mr. WEST.—I have much pleasure in moving that the Report of the Council be adopted, and printed and circulated among the members and associates. I would only make one remark with reference to the recommendation that a standing Finance Committee be appointed. I think that is a most important suggestion. I have had some experience of these matters in other societies, and I think such a committee would be most useful. I think the Society should, if possible, be very much increased ; it has a most important work to do in combating the infidelity of the age, and I shall be most happy to do all that I can in support of such a valuable Institution. (Hear, hear.)

Dr. FRASER.—I have much pleasure in seconding this resolution. I think the recommendation that a standing Finance Committee should be appointed is an obvious necessity ; and I trust it will be very useful. With regard to the necessity for our all striving to do what we can in support of this Institute, I fancy there are none among us who are not anxious that that should be done ; but the difficulty is how to do it. Many will agree with me that the great motto of the Society, *ad majorem Dei gloriam*, should be carried out to its fullest extent ; but, at the same time, it must be understood that there are many members of this Society who, with every good wish and inclination to do what they can, are yet without the means. I myself, for instance, should be most happy to do what I could, but I very much fear my power of doing anything to advance the interests of the Society. In the present age what can be more required, with rationalism on one side and materialism on the other, what can be more required than earnest efforts to stay such encroachments of error ? We should make these efforts as far as our opportunities allow ; and those who perhaps cannot give their attendance might, at all events, give their money freely, and that would be something. And when we remember that all of the papers read here are of great value, and some of them of very remarkable talent, I have no doubt that the members of the Society will agree with me in giving our warmest thanks to those gentlemen who have striven to do what they could to carry out the objects of the Victoria Institute. (Hear, hear.)

The resolution was unanimously carried.

Mr. M'ARTHUR.—I beg leave to move that the thanks of the members and associates be hereby presented to the honorary officers of the Institute for their efficient services during the past year. The last speaker has spoken of the obligations we are under to those gentlemen who have read papers and taken an active part in our affairs. Among them, I need scarcely say, our honorary officers have had far the largest share of work. It would be invidious to make any distinction between them ; but I cannot help referring especially to the very arduous and efficient and valuable services rendered by our Hon. Secretary (hear, hear), who has, from the very commencement of the Institute, been the mainspring of the whole organization (hear, hear) ; and it is to his exertions, to a greater extent than to anything else, that the Institute owes its present position and its past usefulness. I am sure we must all feel

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deeply indebted to those gentlemen, and I have very great pleasure in moving this resolution.

Rev. J. B. Owen.—I have great pleasure in seconding the resolution ; and I feel that, unhappily, I can do so with an amount of disinterestedness that is no credit to me, for I do not think there is a more negligent member of the Council than myself. I am very much in the position of a man whom I once saw rise at a somewhat similar meeting to propose a vote of thanks to those gentlemen who had so efficiently carried on the cause which was left so exclusively to their management. He said, "I cannot do much myself, and I have done but little, but I can appreciate those who do work." (Laughter.) He was a candid man ; and it is well never to lose sight of a candid example, and therefore, as one of the useless inoperative members of the Council, I am placed at that distant point of vision which enables me to appreciate those men who have done their work ; and with much admiration and the profoundest appreciation I have much pleasure in seconding this motion.

The resolution was unanimously agreed to.

Mr. Reddie.—I have much pleasure in returning thanks for the kind manner in which the labours of Admiral Fishbourne, Mr. Mitchell, and myself have been acknowledged. Considering the important objects of the Society, about which we may all speak without any personal feeling, other than to express the deep interest which we are all bound to take in it, I was led to suppose that the Victoria Institute would become a large and vigorous society even sooner than it has done. At the same time, I do not undervalue the success we have experienced. There has, however, been some neglect in the way in which our business affairs have been managed ; but I believe we have seen the worst of that ; and I hope we have also seen the worst of the seeming apathy of the outside Christian public, who ought more largely to come to support us. It is unfortunate that Mr. Owen has not attended our meetings oftener ; but I hope that, after such a confession as he has made, he will come oftener to them in the future. You see how valuable he is when he is present ; for it is impossible not to feel that he can make the best of even a bad condition of things ! I feel that our thanks are especially due to Admiral Fishbourne, our Hon. Treasurer, who has just retired, not from any loss of interest in the Society, for he was one of the first to whom I mentioned the idea of this Institute, and he has co-operated with me in the most valuable manner throughout. During the past year, however, he has been a great deal absent from England, on account of the unfortunate ill-health of his daughter ; and it was with great reluctance that he and we came to the conclusion that we should have some one in England to attend to the affairs of the Society, and that his name must therefore cease to be upon our list as Hon. Treasurer. But I am happy to say that it will still remain as a member of the Council ; and I hope that before long—before our Sessions recommence—he will be with us again as usual. Again I thank you for this resolution. It is a great pleasure to me, and I regard it also as a great privilege to do what I can for the Society ; and if I could only see our members doubled, trebled, or even decupled, I should be truly delighted. (Hear, hear.)

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Mr. MASTERMAN.—I beg to propose that the following gentlemen be the honorary officers and Council of the Institute for the ensuing year :—

President.

The Right Honourable the Earl of Shaftesbury, K.G.

Vice-Presidents.

Philip Henry Gosse, Esq., F.R.S.
Rev. Walter Mitchell, M.A.
Charles Brooke, Esq., M.A., F.R.S., F.R.C.S., &c.
Rev. Robinson Thornton, D.D.

Honorary Treasurer.

William Nowell West, Esq.

Honorary Secretary.

James Reddie, Esq., Hon. Mem. Dial. Soc. Edin. Univer.

Honorary Foreign Secretary.

Edward J. Morshead, Esq., H.M.C.S.

Council.

Robert Baxter, Esq. (*Trustee*).
Rev. A. De la Mare, M.A.
Rear-Admiral E. G. Fishbourne, C.B.
R. N. Fowler, Esq. M.P. (*Trustee*).
W. H. Ince, Esq., F.L.S., F.R.M.S.
Alexander M'Arthur, Esq., F.R.G.S., F.A.S.L.
Alfred V. Newton, Esq., F.A.S.L.
William M. Ord, Esq., M.B.
Rev. J. B. Owen, M.A.
Captain F. W. H. Petrie, F.G.S.
William Vanner, Esq., F.R.M.S.
S. D. Waddy, Esq., B.A., Barrister-at-Law.
Alfred J. Woodhouse, Esq., F.R.M.S.
Rev. J. H. Rigg, D.D.
Rev. C. A. Row, M.A.
Rev. J. H. Titcomb, M.A.
Rev. M. Davison.
H. W. Bleby, Esq., B.A.
J. A. Fraser, Esq., M.D.
Rev. G. Henslow, M.A., F.L.S.
Rev. Charles Graham.
N. Learoyd, Esq.

I do not know why this resolution has been intrusted to me, the last elected member of the Association ; but I hope to be able to help the Institute in some way ; and as I am extremely interested in microscopic studies, if I can be of use in connection with that branch of science, I shall be very glad indeed. A few years ago I believe I was on the high road to infidelity ; but in consequence of the writings which this Society has put forth I have retraced my steps. (Hear, hear.) I feel, therefore, that this is an institution which is extremely needed by the young men of the present day ; for I hardly know any young man with whom I am connected who does not hold more or less unorthodox opinions. It is very important, for the sake of the junior members of society, that the objects of the Institute should be thoroughly carried out, in order that young men may know that, along with scientific knowledge, they may still hold fast to the truths of the Gospel. (Hear, hear.)

The resolution having been seconded, was carried unanimously.

The CHAIRMAN.—Before bringing to an end this our last meeting of the

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session, it will be necessary to trouble you with a few remarks. I think the words which we have heard fall from the lips of our new member, Mr. Masterman, are very satisfactory; and I am sure that every member of the Victoria Institute must be pleased to find that the Institute is doing good work, and, in the opinion of one so well qualified to speak, that it is doing it as it should be done. For my own part I am only too well aware of the truth of what Mr. Masterman stated, that the principles of atheism, materialism, positivism, and every other kind of foul "ism" are being sown broadcast throughout the country. It is necessary that we should have an organization to meet these things. These secularists are themselves organized, and in their own newspaper they talk of "the good cause," write of "the cause of truth," and rejoice in stating that the people receive them where they go proclaiming their doctrines. Now and then their leader has an ovation presented to him, or got up for him, which comes to the same thing, when he goes lecturing on what he calls the prevalence of truth. We should have an organization in the interest of truth to meet theirs against it; and we have this Society expressly constituted to meet those opponents of truth. I rejoice to hope that we have in this Institute what is so much needed, and I think we may well call upon all friends of Christian truth, no matter what their special views of that Christian truth may be, to come and help us in the arduous work which we had before us when we first began our campaign against infidelity. When we first began the work we hardly knew how much lay before us, nor how many were the hydra heads of that enemy against whom we had to array ourselves. We have now found out what the enemy is which we have to cope with. We know that it can only be met by dint of steady application to our work; and therefore I say we may call upon all to aid us, because the work we have to do is not one of mere dilettanteism, and not one of mere amusement, but it is one which has for its object the greater glory of God and the greater happiness—because the eternal happiness—of man. We may well congratulate ourselves I think, then, that Mr. Masterman has joined our Society, and we hope to find in him a member whose aid will be efficient and useful. We have further to congratulate ourselves upon the accession—not perhaps to the number of our members, for the gentleman I am about to name has been a member of the Institute from the first, but to our Council—of our new Hon. Treasurer, who has kindly allowed his name to be substituted for that of Admiral Fishbourne. I think he deserves our warmest thanks. It should be remembered that the office which Mr. West has accepted as Treasurer is an honorary office. It is unpaid, and he will have the satisfaction of knowing that he gratuitously gives much thought and labour to a good cause; but we will all endeavour to make his labours as light as possible. We all owe our thanks too to our retiring Treasurer. Every member of this Institute knows what great interest Admiral Fishbourne has taken in it from the very first, and how much of our prosperity—for I am happy to say we are prosperous—is owing to his disinterested and gratuitous exertions. A few more words and I have done. Let us all remember that

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our campaign is not concluded. We are only retiring into summer quarters for a time, and we must come out again next session with increased strength, and endeavour to extend, if possible, the field of our labours. The Council have very much at heart the transferring of our local habitation to a more suitable place. We have the opportunity, if funds be forthcoming, of engaging rooms which will serve as a library and reading-room for our members—a place in which we may deposit those books, some of them of considerable value, of which we are now possessed, and those books which we expect will come to us when we have a place to put them in, and where members coming from the country may go and sit, and, if necessary, where they may make appointments for meeting together. In point of fact, we wish that our Institute should confer on our members the advantages of a club. We are convinced that if we can manage that, it will extend the influence of our Society, also advance its work very much indeed, and increase the number of our members, and the interest which they and their friends take in the work of the Institute. It is therefore very desirable that funds should be forthcoming to carry out that object, for, unfortunately, however good the object, nothing can be done without "the sinews of war." We therefore put it most earnestly to all our members to endeavour by contributions and otherwise to contribute to the carrying out of this very desirable object.

Mr. Reddie.—Sir, before you adjourn this meeting, I am sure it will be gratifying to every one present, if I make some allusion to a gentleman generally present at all our meetings, but who is not with us to-night—I mean our senior Vice-President, Mr. Mitchell. (Hear, hear.) It is unnecessary to say what his labours have been for the Institute. He is now non-resident, and I stand up now not merely to invite you to record your thanks to him for his most valuable and assiduous labours on our behalf heretofore—and no one has the interests of this Institute more at heart than Mr. Mitchell—but to state, that although he has been presented with a living in the country, and I may say that he has obtained that living from Lord Shaftesbury on account of his connection with this Institute (hear, hear), for it was at this Institute that Lord Shaftesbury made his acquaintance, and became cognizant of his great value as a man of science and a sound theologian—that although Mr. Mitchell will be some ninety miles away in the country, he has given us the expectation—almost I may say the assurance—of being present at many of our meetings. We could not expect him to be present at all; but he has promised to be with us frequently, and I am sure that will be a great satisfaction to all of us. In his absence, then, I think we ought to make a special exception in his case, and record a vote of thanks most cordially to Mr. Mitchell for his past services, and also express our gratification that although he is separated from us locally, he will still be frequently with us at our meetings. (Hear, hear.)

Mr. Ince.—I second the motion most cordially.

The motion was carried by acclamation.

Mr. West.—There is one more name which we ought not to separate with-

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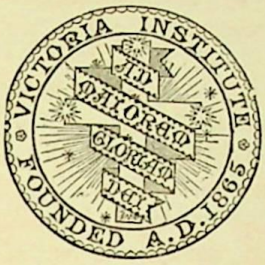
out mentioning, and I am sure it will be agreeable to every member of the Institute. I beg very cordially to move that the best thanks of this meeting be presented to our worthy Chairman and Vice-President, the Rev. Dr. Thornton, who, from the very first, has been one of our most efficient and active members. I am sure I need say nothing more on that subject.

The motion was then seconded and put to the meeting by Mr. Reddie, and carried unanimously.

Dr. Thornton.—A man feels a considerable difficulty when he is thanked for doing that which he likes to do very much indeed. To me anything that I can do here is a labour of love, if indeed I can call it a labour at all. My profession and place of residence prevent me from being quite regular in my attendance here, but I come whenever I possibly can, and I do as much work for the Society as the immense amount of work in my own profession enables me to do. What I have done has been a labour of love, and it has only been too well appreciated by the kindness of the members of this Institute. I sincerely hope that they may not hereafter feel any reason to regret the compliment they have paid me in elevating me to the position of Vice-President. I now declare this meeting and present session at an end.

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APPENDIX (A).



LIST OF THE

VICE-PATRONS, MEMBERS & ASSOCIATES

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

CORRECTED TO DECEMBER 31, 1870.

OFFICES:

8, ADELPHI TERRACE, STRAND, LONDON, W.C.

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OFFICERS & COUNCIL FOR 1870-71.

President.

THE RIGHT HON. THE EARL OF SHAFTESBURY, K.G.

Vice-Presidents.

PHILIP HENRY GOSSE, ESQ., F.R.S.
REV. WALTER MITCHELL, M.A.
CHARLES BROOKE, ESQ., M.A., M.B., F.R.S., F.R.C.S., &c.
REV. ROBINSON THORNTON, D.D.

Honorary Treasurer.

WILLIAM NOWELL WEST, ESQ.

Honorary Secretaries.

JAMES REDDIE, ESQ., Hon. Mem. Dial. Soc., Edin. Univer.
CAPTAIN FRANCIS W. H. PETRIE, F.G.S.

Honorary Foreign Secretary.

EDWARD J. MORSHEAD, ESQ., H.M.C.S.

Council.

ROBERT BAXTER, ESQ. (*Trustee.*)
REV. A. DE LA MARE, M.A.
REAR-ADMIRAL E. G. FISHBOURNE, R.N., C.B.
ROBERT N. FOWLER, ESQ., M.A., M.P. (*Trustee.*)
WILLIAM H. INCE, ESQ., F.L.S., F.R.M.S.
ALEXANDER M^cARTHUR, ESQ., F.R.G.S., F.A.S.L.
ALFRED V. NEWTON, ESQ., F.A.S.L.
WILLIAM M. ORD, ESQ., M.B.
REV. J. B. OWEN, M.A.
WILLIAM VANNER, ESQ., F.R.M.S.
S. D. WADDY, ESQ., B.A., Barrister-at-Law.
ALFRED J. WOODHOUSE, ESQ., F.R.M.S.
REV. J. H. RIGG, D.D.
REV. C. A. ROW, M.A.
REV. J. H. TITCOMB, M.A.
REV. M. DAVISON.
H. W. BLEBY, ESQ., B.A.
J. A. FRASER, ESQ., M.D.
REV. G. HENSLOW, M.A., F.L.S.
REV. CHARLES GRAHAM.
N. LEAROYD, ESQ.
T. W. MASTERMAN, ESQ.

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VICE-PATRONS.

H. W. PEEK, ESQ., M.P., J.P.

B. BOND CABBELL, Esq., M.A., F.R.S., &c. &c.

A. McARTHUR, ESQ, F.R.G.S.

ROBERT BAXTER, ESQ.

*** The Qualification of a Vice-Patron is a Contribution of not less than Sixty Guineas to the Funds of the Institute.

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The Members and Associates included in the original Foundation List, closed December 31, 1866, are distinguished by an ℱ; the dates of election are prefixed to the names of those since elected.

MEMBERS.

(*Members of Council* *. *Life Members* †.)

¶ *Distinguishes those who have contributed Papers to the Institute.*

A.

1869.
Jan. 18. Allen, G. W. Esq. Solicitor, *Sydney, New South Wales.*

1869.
May 3. Allen, W. Shepherd, Esq. M.P. *Reform Club, S.W.*

ℱ Anderson, William, Esq. M.R.C.S.E. Surgeon R.N. *Fort Cumberland, Southsea.*

ℱ Armytage, Rev. J. N. Green, M.A. Cantab. *Clifton, Bristol.*

ℱ Arthur, Rev. William, M.A. *Belfast.*

ℱ Auriol, Rev. Edward, M.A. Prebendary of St. Paul's, Rector of St. Dunstan's in the West, 35, *Mecklenburg Square, W.C.*

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B.

1868.

May 4. Badenoch, Rev. George Roy, Memb. Gen. Council Glasgow Univ. 1, *Whitehall Gardens, S.W.*

1869.

Nov. 15. Bagster, H. Theodore, Esq. 10, *Down Street, and Junior Athenæum Club, Piccadilly, W.*

1868.

June 15. Balmain, W. H. Esq. *St. Helen's, Lancashire.*

1869.

Feb. 15. Barker, John L. Esq. *Homehill, Bowdon.*

JF Barker, Rev. Matthias, M.A. *Warden Lodge, Cheshunt.*

JF † Barrington, William, Esq. C.E. 51, *George Street, Limerick; and Ballywilliam Cottage, Rathkeale.*

JF Barter, The Hon. Charles, B.C.L. Oxon. (Memb. of Legislative Council of Natal), *The Start, Pietermaritzburg, Natal.*

JF Bathurst, Rev. W. H., M.A. *Lydney Park, Gloucestershire.*

JF *†BAXTER, ROBERT, Esq. Solicitor, 10, *Queen Square, Westminster, S.W.* (TRUSTEE and VICE-PATRON.)

JF Beaufort, Rev. D. A., M.A. *Warburton Rectory, Warrington.*

JF Blackwood, Rev. J. Stevenson, D.D. LL.D. *Middleton Tyas, Richmond, Yorkshire.*

1867.

Nov. 25. *Bleby, Henry W. Esq. B.A. Lond. Solicitor, *Vernon House, Sandown, Isle of Wight.*

JF Blomefield, Rev. *Sir* T. Eardley Wilmot, *Bart.* M.A. Cantab. *Incumbent of All Saints', Pontefract, Yorkshire.*

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1870.

Dec. 5. Bowker, H. F. Esq. 12, *Farquhar Terrace, Dulwich Park Road, S.E.*

℣ Boyce, Rev. W. B., F.R.G.S. 3, *Angel Terrace, Brixton, S.W.*

℣ Braithwaite, Charles Lloyd, Esq. Manufacturer, *Kendal, Westmoreland.*

℣ † Braithwaite, Isaac, Esq. F.R.G.S. Assoc. I.N.A. 4, *Gloucester Square, Hyde Park, W.*

1867.

Nov. 18. *†¶ Brooke, Charles, Esq. M.A. Cantab. F.R.S. F.R.C.S. Pres. Meteor. Soc. V.P.R.M.S. and Surgeon to the Westminster Hospital, 16, *Fitzroy Square, W.* (Vice-President.)

℣ Brown, Robert, Esq. Solicitor and Registrar of County Court, *Barton-on-Humber.*

1869.

Jan. 18. Budgett, James S. Esq. *Ealing Park, Middlesex.*

℣ Budgett, W. H. Esq. Merchant, *Redland House, Bristol.*

℣ Burnett, Montagu, Esq. M.A. Cantab. F. Cam. Phil. S. F.R.M.S. *Westbrook House, Alton, Hants.*

℣ Butler, Henry, Esq. H. M. Civ. Ser. *Bexley House, Blackheath, S.E.*

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C.

† CABBELL, BENJAMIN BOND, Esq. M.A. F.R.S. V.P.R.I. F.R.S.L. M.R.A.S. V.P.Z.S. F.R.H.S. F.R.G.S. Bencher of the Middle Temple, J.P. and D.L. for Middlesex, &c. &c. 1, *Brick Court, Temple; and 52, Portland Place, W.* (VICE-PATRON.)

Carryer, S., Esq. 13, *High Street, Newcastle-under-Lyme.*

Chance, Edward, Esq. J.P. *Lawnside, Malvern.*

Cheyne, R. R. Esq. F.R.C.S. Eng. 27, *Nottingham Pl. W.*

Clegg, Thomas, Esq. Liberian Consul, Memb. Institut d'Afrique, &c. *Cheetham Hill, Manchester.*

Colebrook, John, Esq. M.R.C.S. Eng. late H.M. Madras Army, 15, *St. Leonard's Terrace, King's Road, Chelsea, S.W.*

Conway, Rev. William, M.A. Canon of Westminster, and Rector of St. Margaret's, Westminster, 17, *Dean's Yard, Westminster, S.W.*

Crawford, Major-General R. Fitzgerald, R.A. *Erskine House, Harrow, N.W.*

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D.

1867.

Aug. 5. Darby, Henry, Esq. *Parsonstown, Ireland.*

ℱ Davis, Rev. Weston B., M.A. Principal Torquay Preparatory College, *Apsley House, Torquay.* (Hon. Loc. Sec.)

ℱ ¶* Davison, Rev. M. 5, *Lansdowne Place, Lansdowne Road, Hackney, N.E.*

ℱ Deane, Rev. Charles, D.C.L. Oxon. (formerly Fellow of St. John's Coll.) *Rosmore, Spring Grove, W.*

ℱ ¶* De La Mare, Rev. A., M.A. Cantab. *Rector of St. Thomas, Woolwich, S.E.*

ℱ Duke, Rev. Edward, M.A. F.G.S. *Lake House, Salisbury.*

ℱ Duncan, James, Esq. Merchant, 6, *Aldermanbury Postern, E.C.*

ℱ Duncan, William Aver, Esq. *Woodlands House, Red Hill.*

E.

ℱ † Elliott, William Henry, Esq. *Maitland House, Kensington, W.*

ℱ Ellis, William Robert, Esq. M.A. Cantab. Barrister-at-Law, 197, *Maida Vale, W.*

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F.

1870.

Dec. 5. † Faulconer, R. S., Esq. *Clarence Road, Clapham Park, S.*

JF * Fishbourne, Rear-Admiral Edmund Gardiner, C.B. Vice-President of the Royal United Service Institution, 2, *Duke Street, W.C.*

JF Fleming, Rev. T. S., F.R.G.S. Assoc. Sec. Ch. Miss. Soc. *Roscoe Place, Leeds.* (Hon. Loc. Sec.)

JF *† Fowler, Robert N. Esq. M.A. M.P. 50, *Cornhill, E.C.* (Trustee.)

JF * Fraser, James Alexander, Esq. M.D. Deputy Inspector-General, Army Hospitals, 11, *Victoria Road, Gipsy Hill, S.E.*

G.

JF Gailey, Alexander, Esq., Merchant, *Harengey Park, Hornsey, N.*

JF ¶ Garbett, Rev. Edward, M.A. Oxon. *Christ Church Parsonage, Surbiton Hill, S.W.*

JF Gell, Rev. John Philip, M.A. *St. John's, Notting Hill, W.*

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℣ Glyn, Rev. *Sir* George L. *Bart.* M.A Vicar of *Ewell, Surrey.*

℣ Goldsmith, Malcolm, Esq. H. M. Civ. Serv. *Mannamead, near Plymouth.*

1868.
Mar. 2. Gooddy, Edward C. Esq. *The Edge, near Meltham, Huddersfield.*

1870.
Feb. 7. Goren, James Newton, Esq. M.A. Cantab. (Senior Fellow Queen's Coll. Camb.), Barrister-at-Law, 6, *Stone Buildings, Lincoln's Inn, W.C.*

℣ * Gosse, Philip Henry, Esq. F.R.S. *Sandhurst, Torquay.* (Vice-President.)

1867.
June 17. * Graham, Rev. Charles, 1, *Belgrave Terrace, Shepherd's Bush, W.*

℣ † Griffith, John, Esq. 6, *Hanover Terrace, Regent's Park, N.W.*

H.

℣ Hall, J. Esq. Merchant, 1, *New London Street, E.C.*

℣ Halsted, Vice-Admiral Edward Pellew, 86, *Ebury Street, S.W.*

℣ Hardwicke, Robert, Esq. F.L.S. 192, *Piccadilly, W.*

℣ Harrison, Gibbs Crawfurd, Esq. H.M. Civ. Serv. 222, *Marylebone Road, N.W.*

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℣ Haughton, Edward, Esq. M.D. Edin. M.R.C.S. Eng. A.B. T.C.D. 80, *Kensington Park Road, Notting Hill, W.*

℣ Healey, Elkanah, Esq. *Oakfield, Gateacre, Liverpool; and "Engineer" Office, Strand, W.C.*

1869.

Apl. 5. ¶* Henslow, Rev. George, M.A. F.L.S. F.C.P.S. *St. John's Parsonage, St. John's Wood, N.W.*

℣ Hitchman, Rev. Richard (St. Aidan's College), 1, *Goldington Crescent, Camden Town, N.W.*

1870.

Mar. 21. ¶ Hitchman, William, Esq. M.D. M.R.C.S. Lond. Pres. Liverpool Anthrop. Society, 29, *Erskine Street Islington Square, Liverpool.*

1867.

Nov. 11. Hooley, William, Esq. Banker, *Mile End, Stockport.*

℣ Horton, Captain William, R.N. *United Service Club, Pall Mall, S.W.*

1869.

Jan. 18. Howard, James, Esq. M.P. *Bedford.*

I.

℣ † Ince, Joseph, Esq. Assoc. K.C.L. M.R.I. F.L.S. F.G.S. &c. 26, *St. George's Place, Hyde Park Corner, S.W.*

℣ * Ince, William H. Esq. F.L.S. F.R.M.S. F.R.H.S. 27, *Thurloe Square, Brompton S.W.*

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℣ ¶ Irons, Rev. William J., D.D. Oxon. Prebendary of St. Paul's, Rector of *Wadingham, Lincolnshire.*

J.

1867.

Aug. 5. Jackson, John J. Esq. Colonial Broker, *Fern Cliff, St. John's Park, Blackheath, S.E.*

1870.

Feb. 21. James, Herbert, Esq. H.M. Civil Serv. *The Admiralty, Somerset House, W.C.*

℣ James, Rev. John, *Rector of Avington, Berks.*

℣ Jenkins, D. J. Esq. 61, *Marquis Road, Canonbury, N.*

1869.

June 21. Jenkins, Rev. E. E., M.A. *Clyde House, Brixton Hill, S.W.*

1867.

June 3. Jennings, the Ven. Archdeacon, M.A. 18, *Dean's Yard, Westminster, S.W.*

℣ Jepps, Charles Frederick, Esq. *Claremont Villas, Streatham Hill, S.*

℣ Johnson, Rev. Edward, *Albert Cottage, Mount Pleasant, Newcastle-under-Lyme.* (Hon. Loc. Sec.)

℣ Johnston, D. W. Esq. *Dalriada, Belfast.*

1868.

Feb. 17. Jones, H. Cadman, Esq. Barrister-at-Law, M.A. Cantab. late Fellow Trin. Coll. Camb. 4, *Old Buildings, Lincoln's Inn W.C.,*

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K.

℣ Kemble, Rev. Charles, M.A. Oxon. Rector of Bath, *Vellore, Bath, Somerset.*

1869.

May 3. Kiell, George Middleton, Esq. 8, *Kensington Park Gardens, W.*

℣ ¶ Kirk, Rev. John, Professor of Practical Theology in the Evangelical Union Academy at Glasgow, 17, *Greenhill Gardens, Edinburgh.*

L.

1869.

Sept. 20. Laird, John, Esq. M.P. 10, *Park Place, St. James's Street, S.W.; and Birkenhead.*

℣ Lawrence, Major-General, Sir A. S., K.C.B. *Clapham Common, S.W.*

1869.

May 3. * Learoyd, Nehemiah, Esq. 17, *Finchley Road, N.W.*

℣ Lewis, Joseph, Esq. R.N. *Hamilton Villa, Southampton.*

℣ Lidgett, George, Esq. B.A. Lond. 11, *Blackheath Terrace, S.E.*

1869.

Feb. 1. Lindsay, James S. Esq. Merchant, *Wheatfield, Belfast.*

℣ Lloyd, B. S. Esq. Merchant (*Office*), 3, *George Yard, Lombard Street, E.C.*

1867.

Feb. 18. Lomas, Thomas, Esq. H.M. Civ. Serv. *Malvern House, Buxton, Derbyshire.*

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℣ Lowe, Rev. R. T. M.A. Cantab. Mem. Lisbon Roy. Acad. of Sciences, Cor. Mem. Z.S.L. *Lea Rectory, Gainsborough.*

1867.

Nov. 18. LUSH, THE HON. SIR ROBERT, Judge of the Court of Queen's Bench, 60, *Avenue Road, N.W.*

1868.

June 15. Lysons, Rev. Samuel, M.A. F.S.A. Hon. Canon of Gloucester Cathedral, *Hempsted Court, near Gloucester.*

M.

1869.

Jan. 18. Macafee, A. H. C. Esq. *Sydney, New South Wales.*

1868.

Feb. 17. Macmillan, Rev. Archibald, 45, *Warrington Crescent, Warwick Road, Maida Vale, W.*

℣ Manners, Rev. John, M.A. Cantab. 6, *Victoria Park Square, N.E.*

℣ Marsh, Rev. *Sir* W. R. Tilson-, M.A. Oxon. *Oxford and Cambridge Club, Pall Mall, S.W.*

℣ *†McARTHUR, ALEXANDER, Esq. F.R.G.S. F.A.S.L. Merchant, *Raleigh Hall, Brixton Rise, S.W.* (VICE-PATRON.)

℣ McArthur, William, Esq. M.P. 1, *Gwydyr House, Brixton Rise, S.W.*

1869.

June 21.¶ M'Cann, Rev. James, D.D. F.R.S.L. F.G.S. Incumbent of St. Jude's Church, Glasgow, 9, *Elgin Terrace, Partick, Glasgow.*

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℣ ¶ McCausland, Dominick, Esq. Q.C. LL.D. 12, *Fitzgibbon Street, Dublin.*

℣ † McFarlane, Patrick, Esq. *Comrie, Perthshire.*

1869.

June 21. *Masterman, Thomas William, Esq. *Kendrick Villa, London Road, Reading.*

℣ Merriott, Frederick, Esq. 17, *Cambridge Road, Hammersmith, W.*

1868.

Mar. 2. Mewburn, William, Esq. *Wykham Park, Banbury.*

℣ Miller, William V. Esq. R.N. *Trellis Cottage, Whitepoint, Queenstown.*

℣ Milner, Rev. John, B.A.Oxon. Chaplain R.N. *H.M.S. Galatea, and Hartley, near Brough, Westmoreland.*

℣ ¶*Mitchell, Rev. Walter, M.A.Cantab. Rector of *Purton, near Swindon.* (Vice-President.)

℣ Monckton, Lieut.-Col. *Hon.* H. M. *Howe Lodge, Wimborne, Dorset.*

1867.

June 3. † Morley, Samuel, Esq. M.P. *Craven Lodge, Stamford Hill, N.*

℣ ¶* Morshead, Edward J. Esq. H.M. Civ. Serv. 32, *Kenton Street, W.C.* (Hon. Foreign Secretary.)

1868.

Jan. 20. Mullings, Richard, Esq. Solicitor, *Stratton, near Cirencester.*

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N.

F Napier, John, Esq. Shipbuilder, *Saughfield House, Glasgow.*

F Napier, Robert, Esq. Shipbuilder, *Glasgow; West Shandon, Dumbartonshire.*

1870.

May 2. Newman, Robert Rutland, Esq. Solicitor, 53, *Upper Bedford Place, W.C.*

F * Newton, Alfred V. Esq. F.A.S.L. *Cleveland Villa, Lee, S.E.*

F Niven, Rev. William, B.D. Incumbent of St. Saviour's, Chelsea, 5, *Walton Place, Chelsea, S.W.*

O.

F * Ord, William M. Esq. M.B. Lond. Lecturer on Physiology and on Comparative Anatomy, St. Thomas's Hospital, *Streatham Hill, S.W.*

F * Owen, Rev. J. B., M.A. Cantab. Rector of St. Jude's, Chelsea, 40, *Cadogan Place, Chelsea, S.W.*

P.

F Patton, John, Jun., Esq. 11, *Pembury Road, Lower Clapton, E.*

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Pears, Rev. Edmund W., M.A. Oxon. *St. Peter's Rectory, Dorchester.*

† PEEK, HENRY WILLIAM, Esq. M.P. J.P. for Surrey, *Wimbledon House, S.W.* (VICE-PATRON.)

Pennefather, Rev. William, A.B. 2, *Mildmay Road, N.*

¶ Penny, Edward Burton, Esq. *Altamira, Topsham, Devon.*

* Petrie, Captain Francis W. H. (late 11th Regiment), F.R.S.L. F.G.S. Member Archæological Institute, 25, *Parliament Street, S.W.* (HON. SECRETARY.)

Petrie, Samuel, Esq. C.B. 113, *Ebury Street, Pimlico, S.W.*

Prothero, Thomas, Esq. F.S.A. M.R.I. Barrister-at-law, 16, *Cleveland Gardens, W.*

R.

Rainey, Arthur C. 5, *Maunder's Terrace, Ranelagh, Dublin.*

Ratcliff, Charles, Esq. *Wyddrington, Edgbaston, Birmingham.*

¶*Reddie, James, Esq. H.M. Civ. Serv., Hon. Mem. Dial. Soc. Edin. Univ., 44, *Royal Crescent, Notting Hill, W.* (HONORARY SECRETARY.)

* Rigg, Rev. James H., D.D. 130, *Horseferry Road, Westminster, S.W.*

Robertson, Peter, Esq. H. M. Civ. Serv. *Neworth, Kelso, N.B.*

1867.
Dec. 16. ¶* Row, Rev. C. A., M.A. Oxon. 55, *Gloucester Crescent, Regent's Park, N.W.*

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1868.

Nov. 30. RUTLAND, HIS GRACE THE DUKE OF, K.G., Lord Lieutenant of Leicestershire, &c. &c. 10, *Cromwell Road, S.W.; Belvoir Castle, Grantham; and Cheveley Park, Newmarket.*

S.

Scales, George J. Esq. Merchant, *Belvoir House, Hornsey Lane, N.*

Selwyn, Captain Jasper H., R.N. *Chequers Court, Tring, Herts.* (*Messrs. Stilwell*, 22, *Arundel Street, Strand, Agents.*)

*† SHAFTESBURY, *the Right Hon.* THE EARL OF K.G. 24, *Grosvenor Square, W.* (PRESIDENT.)

Shaw, E. R. Esq. B.A. *Tulse Hill School, Brixton, S.W.*

Shaw, John, Esq. M.D. F.L.S. F.G.S., &c. *Viatoris Villa, Boston, Lincolnshire; and Reform Club, London, S.W.*

Shaw, Rev. William, *Centenary Hall, Bishopsgate Street, E.C.*

Shields, John, Esq. *Church Street, Durham.*

1869.

Jan. 18. Shillington, John J. Esq. Merchant, *Belfast.*

Silver, Stephen W. Esq. Manufacturer, *Bishopsgate Street Within, E.C.*

May 10. Smith, Rev. Payne, D.D. Regius Professor of Divinity, Canon of Christ Church, *Oxford.*

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1869.

℣ † Smith, Protheroe, Esq. M.D. M.R.I. 42, *Park Street, Grosvenor Square, W.*

℣ † Smith, W. Castle, Esq. F.R.G.S. M.R.I. Solicitor, 1, *Gloucester Terrace, Regent's Park, N.W.*

1870.

April 4. Smith, Rev. William Saumarez, M.A. Cantab. Fellow of Trin. Coll. Camb. Principal of *St. Aidan's Theological College, Birkenhead.*

℣ Stalkartt, John, Esq. 5, *Winchelsea Crescent, Dover.*

℣ Sutherland, P. C. Esq. M.D. M.R.C.S. Edin. F.R.G.S. Surv. Gen. *Pietermaritzburg, Natal.*

T.

℣ Thomas, William Cave, Esq. Historical Painter, 49, *Torrington Square, W.C.*

℣ ¶*Thornton, Rev. Robinson, D.D. Oxon. *Trinity College, Glenalmond, Perthshire.* (Vice-President.)

1867.

Aug. 5. ¶* Titcomb, Rev. J. H., M.A. Rector of St. Stephen's, *Wingfield House, South Lambeth Road, S.W.*

℣ Townley, Dr. James, L.R.C.P. Edin. F.R.C.S. Engl. 302, *Kennington Park Road, S.*

℣ Twells, Rev. Henry, M.A. Cantab., late Head Master of the *Godolphin School, Hammersmith, W.*

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Twells, Rev. John, M.A. Cantab. Prebendary of Lincoln, Rural Dean, Rector of *Gamston, Notts.*

† Twells, Philip, Esq. M.A. Oxon. *Chase Side House, Enfield.*

V.

Vallack, Rev. B. W. S., B.A. Oxon. *St. Budeaux's Vicarage, near Plymouth.*

1869.

Feb. 15. Vanner, Henry Thornton, Esq. 27, *Darnley Crescent, Hackney, E.*

Vanner, James Englebert, Esq. Merchant, *Camden Wood, Chislehurst, S.E.*

1867.

June 17. Vanner, John, Esq. *Eliot Vale, Blackheath, S.E.*

* Vanner, William, Esq. F.R.M.S. Merchant, *Camden Wood, Chislehurst, S.E.*

Vickers, J. J. Esq. 3, *Brixton-Hill Terrace, Brixton Hill, S.W.*

W.

* Waddy, Samuel Danks, Esq. B.A. Barrister-at-Law, 3, *Essex Court, Temple, E.C.*

Waddy, Rev. S. D., D.D. *Redlands, Bristol.*

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1867.
June 3. Walrond, T. H. M. Esq. 157, *Cambridge Street, Pimlico, S.W.*

1870.
Oct. 10. Walters, Gregory Seale, Esq. 12, *Chester Terrace, Regent's Park, N.W.*

℣ * West, William Nowell, Esq. 30, *Montague Street, Russell Square, W.C.* (Honorary Treasurer.)

℣ ¶ Wheatley, J. H. Esq. Ph.D. F.G.S. *Abbey View, Sligo.* (Hon. Loc. Sec.)

1868.
Feb. 17. White, Rev. Lewis Borrett, M.A. Oxon. Rector of St. Mary Aldermary, 67, *Queen Street, Cheapside, E.C.*

1870.
Mar. 17. Whitmee, Rev. S. J. Missionary of the London Missionary Society, *Samoa, South Pacific.*

℣ Whitwell, Edward, Esq. *Bank Field, Kendal, Westmoreland.*

1870.
Mar. 21. Wilkinson, Thomas, M.D. St. Andrew's F.R.C.S. Ireland, 20, *Trinity Square, Brixton, S.W.*

℣ Williams, Rev. John, M.A. Cantab. 11, *Mecklenburgh Square, W.C.*

℣ Williams, George, Esq. Merchant, 30, *Woburn Square, W.C.*

℣ Wollaston, Thomas Vernon, Esq. M.A. F.L.S. &c. 1, *Barnepark Terrace, Teignmouth.*

℣ *†Woodhouse, Alfred J. Esq. L.D.S. M.R.I. F.R.M.S. 1, *Hanover Square, W.*

℣ Wright, Francis Beresford, Esq. M.A. Cantab. J.P. F.R.H.S. *Aldercar Hall, Langley Mill, Nottingham.*

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℣ Wright, Rev. Henry, M.A. Oxon. *Standard Hill, Nottingham.*

℣ † Wright, J. Hornsby, Esq. 2, *Abbey Road, Maida Hill, N.W.*

℣ Wyman, C. W. H. Esq. 53, *St. John's Park, Upper Holloway, N.*

Y.

℣ Young, Rev. Charles, M.A. Cantab. 36, *Sussex Square, Brighton.*

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ASSOCIATES.

(1*st class* ‡—2*nd class* ‖—*Life Associates* † *in addition.*)

℣ ‖ Adam, Rev. Stephen C., M.A. Cantab. Assoc. Sec. for Irish Missions, *St. Jude's Vicarage, Wolverhampton.*

℣ ‖ Ballard, Rev. J. Hamilton, M.A. 21, *Marquis Road, Canonbury, N.*

℣ ‖ Barker, Rev. Joseph H., M.A. Cantab. *South House, Hereford.*

℣ ‖ Bartlett, Mrs., *Sussex Square, Brighton.*

℣ ¶‡ Baylee, Rev. Joseph, D.D., late Principal of *St. Aidan's College, Birkenhead.*

1870.

Apr. 4. ‖ Bourne, Rev. H. H., F.R.S.L. 28, *Clarkson Street, Ipswich.*

1868.

Jan. 6. ‖ Brebner, Alexander C. Esq. H.M. Civ. Serv. *Audit Office, Somerset House, W.C.*

1869.

Feb. 1. ‖ Bretherton, Francis, Esq. Stockbroker, *Melville Lodge, Tulse Hill, S.W.*

℣ ‖ Broke, Miss, 4, *Marlborough Buildings, Bath.*

1867.

Feb. 18. ‡ Browell, W. F. Esq. *Broadlands, Tunbridge Wells.*

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℣ ‖ Burgess, Captain Boughey (late H.M. Indian Army), Secretary to the Royal United Service Institution, *Whitehall Yard, S.W.*

℣ ‖ Chubb, John, Esq., Assoc. Inst. C.E. *Radcliffe House, Brixton Rise, S.W.*

1867.

June 3. ‖ Colan, Hunter Alexander, Esq. M.R.C S. Lond. *Royal Victoria Hospital, Netley, Hants.*

℣ ‖ Colan, Thomas, Esq. M.D. Surgeon R.N. *H.M.S. Rattlesnake, Cape of Good Hope.*

1869.

Aug. 7. ‖ Colley, Henry F. Esq. M.A. Trin. Coll. Dublin, J.P. *Lucan Lodge, Co. Dublin.*

℣ ‖ Cowan, Rev. Ernest, B.A. Cantab., Assoc. Sec. C. & C. Ch. Soc. 1, *Avenue Villas, Shooter's Hill Road, S.E.*

℣ †‖ Curteis, Mrs., *Aldenham, St. James's Road, Tunbridge Wells.*

℣ ‖ Delpratt, W. Esq. M.R.C.S. *National Club, Whitehall Gardens, S.W.*

1869.

May 3. ‖ DERRY and RAPHOE, The Right Rev. the Lord Bishop of, *Athenæum Club, London, S.W., and the Palace, Derry.*

Jan. 18. ‖ Dibdin, R. W. Esq. F.R.G.S. 62, *Torrington Square, W.C.*

Jan. 18. ‖ Dibdin, Charles, Esq. F.R.G.S. H.M. Civ. Serv. 62, *Torrington Square, W.C.*

1870.

Mar 7. ‖ Dugmore, Rev. H. H. *Queenstown, Cape of Good Hope.*

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℣ ‖ Ensor, Thomas, Esq. Merchant, *The Cottage, St. Leonard's, Exeter.*

1870.

Nov. 21. ‡ Edmond, Francis, Esq., Advocate, 5, *Albyn Place, and Kingswells, Aberdeen.*

℣ ‡ Fairfax, John, Esq. (Proprietor of *Sydney Morning Herald*), *Sydney, New South Wales.*

1869.

*Feb.*15. ‡ Finley, Samuel, Esq. Merchant, *Montreal, Canada.*

℣ ‖ Gardiner, Major G. C., R.S.F. 25, *Grosvenor Mansions, Westminster, S.W.*

℣ ‖ Grant, Captain Henry D., R.N. 4, *Sussex Place, Southsea.*

℣ ‖ Hamilton, William, Esq. M.D. L.R.C.S. Ireland, 11, *Standwick Place, Edinburgh.*

℣ ‖ Hare, Rev. Henry, A.B., Chaplain to the Forces, *Parkhurst Barracks, Isle of Wight.*

1870.

May 2. ‖ Harris, William John, Esq. M.R.C.S.E. L.A.C. F.M.S. 13, *Marine Parade, Worthing.*

1869.

Mar. 1. ‖ Harvard, Rev. John, *Wesley College, Sheffield.*

1869.

Feb. 15. ‡ Henderson, John, Esq. Merchant, *Glasgow.*

1870.

Oct. 10. ‡ Hiles, Joseph, Esq. Mem. Liv. Geol. Soc. *Irene, Clifton Road, Liverpool.*

℣ ‡ Hunt, Thornton, Esq. 26, *Euston Square, W.C.*

℣ ‖ Ivall, David, Esq. *Somers Cottage, Upper Tulse Hill, S.W.*

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℣ ‖ Lucas, H. Walker, Esq. 21, *Priory Road, Kilburn, N.W.*

℣ † ‖ Lycett, Sir Francis, Ex-Sheriff of the City of London, 18, *Highbury Grove, N.*

1867.
Nov. 11. ‖ Martin, Rev. Nicholas C., A.B. Trin. Coll. Dubl. *The Rectory, Carndonagh, Co. Donegal.*

1869.
May 3. ‖ Money, Rev. C. F. S., M.A. Cantab. *St. John's Parsonage, Upper Lewisham Road, S.E.*

℣ ¶ ‖ Moule, Rev. Henry, M.A. Cantab. Vicar of *Fordington, Dorset.*

℣ ‖ Payne, William, Esq. *Guildhall, City.*

1869.
Mar. 1. ‖ Race, George, Esq. Merchant, *Westgate, Weardale, Darlington.*

℣ ‡ Ranking, Rev. George, B.C.L. Cantab. *Beulah Road, Tunbridge Wells.*

℣ ‖ Salt, Mr. Thomas G., Chemist, 7, *Downs Park Road, Shacklewell, N.E.*

1870.
Apr. 18. ‖ Savile, Rev. Bourchier Wray, M.A. Cantab. *Combe Rectory, Teignmouth.*

1870.
Jan. 17. ‖ Scott, Rev. Robinson, D.D. *Belfast.*

℣ ‖ Skrine, Rev. S., M.A. 20, *Devonshire Terrace, Hyd. Park, W.*

1870.
Nov. 7. ‡ Smith, Neil, Jun. Esq. A.M. 14, *Carden Place Aberdeen.*

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1869.
Mar. 1. || Smith, Samuel Hill, Esq. *Sheffield.*
1868.
Oct. 19. ‡ Stone, David Henry, Esq. Alderman of London, 13, *Poultry, E.C., and Castleham, Hollington, Sussex.*
1870.
May 21. || Sutcliffe, James T. Esq. *Bacup, near Manchester.*

℣ || Thornton, Rev. Samuel, M.A. Rector of St. George's, 142, *Hockley Hill, Birmingham.*

1869.
Apr. 19. || Turnbull, Robert O. Esq. *Auckland House, Bishop Auckland.*
1870.
June 6. || Turner, Rev. James, B.A. *Deddington Vicarage, Oxford.*

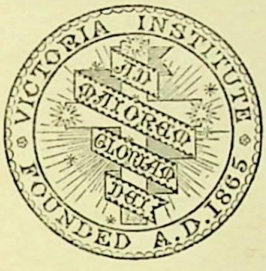
℣ || Vessey, Leonard Abington, Esq. 13, *College Green, Bristol.*

1869.
June 7. †|| Walsh, Rev. John Henry Arnold, M.A. Oxon. Rector of *Bishopstrow, Warminster.*
1870.
May 2. || Williams, Rev. Frederic, Exhib. from Eton Coll. Scholar of C.C.C., B.A. Cantab. *Saltley Vicarage, near Birmingham.*

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APPENDIX (B).



LIST OF BOOKS

IN THE LIBRARY OF

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A.

Adam and the Adamite; or, the Harmony of Scripture and Ethnology. By D. McCausland, Q.C., LL.D.

Ages of the Earth: Biblical Testimonies to the Earth's Antiquity and Progressive Development. By Rev. David Pitcairn, D.D.

Ancient Empires: their Origin, Succession, and Results; with a Preliminary View of the Unity and First Migration of Mankind.

Ancient Pillar Stones of Scotland. By G. Moore, M.D.

Animal Physiology. By W. B. Carpenter, M.D.

Anti-Secularist Lectures. By Rev. J. McCann, D.D.

Architecture. Reports and Papers read at the Meetings of the Architectural Societies of the County of York during the the Year 1865.

Astronomical Geology: A Treatise respecting the Causes to which the Structural and Superficial Configuration of the Earth's Crust is attributable. By R. G. M. Browne.

Astronomy, Current Physical,—Critically Examined and Confuted. By J. Reddie.

Astronomy. See *Mazzaroth; Solar System.*

Athenæum, The, for 1870.

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B.

Babylonianism; or, the Devil's Travesty of the Kingdom of the Son. By R. Brown.

Bagster's Chronological Atlas: a Complete Series of Maps Elucidatory of the Sacred History.

Bible of every Land.

Bible, Cruden's Concordance to the Holy.

Bible. See *Pentateuch*; *Scripture*.

Bible, The, and Modern Thought. By Rev. T. R. Birks, M.A.

Bible, Truth of the. By Rev. B. W. Savile, M.A.

Biblical and Theological Instruction, A Course of. 2 vols. By Rev. J. Baylee, D.D.

Biblical Criticism, A Compendium of. By F. Sargent.

Biographical Treasury. By S. Maunder.

Birds, British, The Food, Use, and Beauty of. By C. O. G. Napier.

Black Diamonds; or, the Gospel in a Colliery District. By H. H. Bourne.

Botany:—

Hortus Cantabrigiensis; or, an Accented Catalogue of Indigenous and Exotic Plants cultivated in the Cambridge Botanic Gardens. By James Donn.

Prodromus Systematis Naturalis Regni Vegetabilis. Par A. De Candolle. 20 tom.

British Quarterly Review. Vols. III. and IV.

Bunsen, Baron, A Review of the Memoir of.

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C.

Candlish, Rev. Dr. See *Genesis.*

Candolle, A. De. See *Botany.*

Cause and Effect; or, the Globe we Inhabit. By R. M. Browne, F.G.S.

Census, The Roman. See *Gospel Narrative.*

China. Ti-Ping Tien-Kwoh; the History of the Ti-Ping Revolution. 2 vols.

Christ in the Pentateuch; or, Things Old and New concerning Jesus. By H. H. Bourne.

"Christ is All:" The Gospel of the Pentateuch. By the Very Rev. Henry Law. 4 vols.

Christ of the Gospels, The, and the Romance of M. Renan. By Rev. Dr. Schaff and M. Napoléon Roussel.

Christ our Light. By Charles Graham.

Christian Evidences. See *Bible; Christ; Daniel; Ethnology; Geology; Gospel; Inspiration; Prophetic Outlines; Radiation; Scripture and Science; Shinar.*

Christian Faith, The Formularies of; a Sermon. By Rev. S. Lysons, M.A.

Christianity and Common Sense. By Sir W. Jones, M.A.

Christianity, The Early Years of. By E. De Pressense, D.D.

Christianum Organum; or, the Inductive Method in Scripture and Science. By J. Miller, M.A.

Clement of Rome, The Epistle of, to the Corinthians; with an Introduction and Notes. Translated by B. H. Cowper.

Coal under Secondary Formations. By J. Holdsworth.

Colenso, Bishop:—

A full Review and Exposure of Bishop Colenso's Errors and Miscalculations in his Work, "The Pentateuch and Book of Joshua Critically Examined." By the Hon. Judge Marshall.

Anti-Colenso. By Johannes Laicus.

An Old Indian's Plain Solution of some of the Difficulties of Dr. Colenso. By J. Stalkartt.

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Colenso, Bishop :—

The Pentateuchal Narrative Vindicated from the Absurdities charged against it by the Bishop of Natal. By J. C. Knight.

The Incredibilities of Part II. of the Bishop of Natal's Work upon the Pentateuch. By J. C. Knight.

Collisions at Sea, On the Value of Coloured Side Lights as a Means for preventing. A Lecture delivered at the Sailors' Home, by T. Gray.

Comprehensive Bible.

Conservatism of Nature, The; or, Life *versus* Denudation. Three Parts.

Creation, the Week of; or, The Cosmogony of Genesis considered in its Relation to Modern Science. By G. Warington.

Cruden's Concordance to the Bible.

Current Physical Astronomy Critically Examined and Confuted. By J. Reddie.

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D.

Death, Victory over. By Rev. W. Niven, B.D.

Deluge, The Mosaic: an Enquiry into the Truth and Certainty of. By Patrick Cockburn, M.D.

Daniel, The Book of: Remarks on the Prophetic Visions in; with Notes on Prophetic Interpretation in connexion with Popery, and a Defence of the Authenticity of the Book of Daniel. By S. P. Tregelles, LL.D.

Discoveries in Science by the Medical Philosopher: an Oration delivered on the Ninety-sixth Anniversary of the Medical Society of London. By Sir G. Duncan Gibb, Bart., M.D.

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E.

Earth, Ages of the. By Rev. Dr. Pitcairn.

Earth, Physical History of the.

Eclectic and Congregational Review, 1868.

Edinburgh Gazetteer, 6 vols.

Edinburgh Philosophical Journal, 7 vols.

Electric Telegraph, The. By Dr. Lardner.

Electric Telegraph: Authorship of the Practical Electric Telegraph of Great Britain. By Rev. T. F. Cooke, M.A.

English Dictionary. By Dr. Nuttall.

Ethnology:—

Papers offered for Discussion at the Meeting of the British Association at, Dundee, in Reply to the Speculations recently promulgated in regard to the Antiquity and Nature of Man. By Rev. James Brodie, A.M.

The First Man and his Place in Creation, considered on the Principles of Science and Common Sense, from a Christian Point of View. With an Appendix on the Negro. By G. Moore, M.D.

See *Adam and the Adamite; Flint Implements.*

Evangelical Alliance: Proceedings of the Amsterdam Conference, August, 1867.

Exodus of Israel, The; its Difficulties Examined, and its Truth Confirmed. By Rev. T. R. Birks.

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F.

Facts and Dates. By Rev. A. Mackay, LL.D.

Fiji and the Fijians. By Thomas Williams and James Calvert. 2 vols.

Flint Implements from Drift not Authentic; being a Reply to the Geological Evidences of the Antiquity of Man. By N. Whitley.

Food Journal, 1870.

Fresh Springs of Truth; a Vindication of the Essential Principles of Christianity.

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G.

Genesis, Book of, Review of Rev. Dr. Candlish's First Lecture on Genesis. By P. M'Farlane, M.V.I.

Genesis. See *Creation, Week of.*

Geography, System of. By James Bell.

Geology :—

A Comparative Estimate of the Mineral and Mosaical Geologies. By Granville Penn. 2 vols.

A New System of Geology, in which the Great Revolutions of the Earth and Animated Nature are reconciled at once to Modern Science and Sacred History. By A. Ure, M.D.

Astronomical Geology. By R. G. M. Browne.

Exposure of the Principles of Modern Geology in a Review of King's "Geology and Religion;" wherein is shown the utter Incompatibility of these Principles with both Science and Sacred History. By P. M'Farlane.

Sermons in Stones; or, Scripture confirmed by Geology. By D. M'Causland, Q.C., LL.D.

See *Flint Instruments.*

Minerals, Mines, and Soils of Ireland, in Reference to the Amelioration and Industrial Prosperity of the Country. By J. Holdsworth, M.G.S.F.

Gloucestershire Illustrations. No. 1. Machin and Madeira: An Attempt to investigate the Truth of the Romantic and Interesting Discovery of that Island. By Rev. S. Lysons, M.A.

Gloucestershire. See *Language.*

Gospel Narrative, Vindicated; or, the Roman Census explained. By Johannes Von Gumpach.

Gospel Truths. By R. Brown.

Gospels: "When were our Gospels Written?" An Argument, by C. Tischendorf; with a Narrative of the Discovery of the Sinaitic Manuscript.

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H.

Handbook of the Year 1868. By G. H. Townsend.

Heavens, The, a Physical Description of. By Alexander Von Humboldt.

Hebrew Poetry, Metrical Versions of Early. By F. Rolleston.

Herschel, Sir J. F. W., Preliminary Discourse on the Study of Natural Philosophy.

Hæmodromometers. By W. H. Griffiths.

Huxley's, Professor, Doctrine of Protoplasm; a Popular Lecture on. By E. B. Penny.

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I.

Imperial Cyclopædia of the Sciences and Arts. 4 vols.

Inspiration; its Nature and Extent. By Rev. C. A. Row, M.A.

Inspiration: God's Word Written; the Doctrine of the Inspiration of Holy Scripture Explained and Enforced. By Rev. E. Garbett, M.A.

Ireland, Geology, Minerals, and Soils of. By J. Holdsworth.

Israel: An Exposition, Critical, Explanatory, and Practical, of Hebrews vi. 4-8, with Reference likewise to Israel as a Nation, in connexion with this particular passage of Scripture. By R. Brown.

Israel, The Exodus of. By Rev. T. R. Birks.

Italy, The Awakening of, and the Crisis of Rome. By Rev. J. A. Wylie, LL.D.

J.

Jesuitism; or, the Devil's Travesty of the Son of the Kingdom. By R. Brown.

Job: Conjectures concerning the Identity of the Patriarch Job, his Family, the Time in which he lived, and the Locality of the Land of Uz. By Rev. S. Lysons, M.A.

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Language. Our Vulgar Tongue: A Lecture on Language in general, with a few words on Gloucestershire in particular. By Rev. S. Lysons, M.A.

Language. See *Shinar*.

Laws of Vital Force in Health and Disease; or, the True Basis of Medical Science. By Dr. E. Haughton.

Life Science, Thoughts on. By B. Place.

Literature, Schlegel's History of.

London Quarterly Review, 1870.

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M.

Matter: What is Matter? By an Inner Templar.

Mazzaroth; or, the Constellations. By Fr. Rolleston.

Medical Science. See *Laws of Vital Force.*

Medical Times, 1870.

Medical Philosopher, Discoveries in Science by the.

Meteorology: The Weather Book. By Rear-Admiral Fitzroy.

Metrical Versions of Early Hebrew Poetry. By Fr. Rolleston.

Miracles:—

A Conversation on Miracles; showing that they are not only not opposed to the Laws of Nature, but are positively explained by true Scientific Law. By E. B. Penny.

Mozley and Tyndall on Miracles. By W. Fowler, LL.B.

More Light: A Dream of Science.

Mosaic Deluge, The, an Inquiry into the Truth and Certainty of. By Patrick Cockburn, M.A.

Mosaical and Mineral Geologies, a Comparative Estimate of the. By Granville Penn.

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N.

Natal, Bishop of. See *Colenso, Bishop.*

Natural Philosophy. 2 vols.

Nature: a Weekly Illustrated Journal of Science. Vol. I.

Nature, The Conservatism of; or, Life *versus* Denudation.

Notes and Queries, 1870.

Nova Scotia: Proceedings and Transactions of the Nova Scotian Institute of Natural Science. Vol. II.

O.

Optics. By Sir David Brewster.

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P.

Pentateuch, The Gospel of the. By the Very Rev. Dean Law. 4 vols.

Pentateuch, Christ in the. By H. H. Bourne.

Pentateuch. See *Colenso, Bishop.*

Philosophy, Moral and Metaphysical. By Rev. F. D. Maurice.

Philosophy, Treasury of Natural and Experimental.

Plain Sermons for Perilous Times. By Rev. W. Niven, B.D.

Plurality of Worlds: The Positive Argument from Scripture. By Rev. R. Knight.

Prayer Meeting Addresses.

Preaching of the Gospel, The. By R. Brown.

Pre-Adamite Man.

Prophetic Outlines: The Four Kingdoms, as foreshadowed to Daniel and St. John. By John Rees Mogg. 2 vols.

Protoplasm. See *Huxley, Professor.*

Prussia, The History of, from the time of the Knights of the Cross and Sword to the Occupation of Hanover, 1867. By M. A. D.

Q.

Quartz and Opal: An Elementary Treatise on. By G. W. Traill.

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Radiation, The Phenomena of, as exemplifying the Wisdom and Beneficence of God. By G. Warington.

Regeneration viewed in Connexion with Baptism.

Religious Subjects, Thoughts on. By a Layman.

Renan, M. The Christ of the Gospels and the Romance of M. Renan. By Dr. Schaff and M. Roussel.

Revelation, System in. By P. McFarlane.

Ritualism at Barton-on-Humber. By R. Brown.

Rolleston, Letters of Miss Frances. Edited by Caroline Dent.

Romanism, the Novelties of, in Three Parts. I. Development of Doctrines. II. Chronological Arrangement. III. Old and New Creeds contrasted. By C. H. Collette.

Rome, from the Fall of the Western Empire. By Rev. Canon Trevor, M.A.

Royal Institution of Great Britain, Proceedings of the, 1851-1869. 6 vols.

Royal Society, An Abridgment of the Philosophical Transactions of the. 10 vols.

Rule of Road at Sea. By T. Gray.

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S.

Saturday Review. 28 vols.

Scepticism, The Anatomy of: an Examination into the Causes of the Progress which Scepticism is making in England. By R. B. Girdlestone, M.A.

Scepticism, Modern, viewed in Relation to Modern Science. By J. R. Young.

Science and Christian Thought. By J. Duns, D.D.

Science and Scripture. See *Scripture.*

Scientific Opinion. Vols. I., II., and III.

Scotland, Ancient Pillar Stones of. By G. Moore, M.D.

Scripture. A Collation of the principal English Translations of the Sacred Scriptures. By C. Roger.

Scripture and Science. See *Adam; Ages; Christianum Organum; Creation; Deluge; Exodus; Fresh Springs of Truth; Geology; Miracles; Scepticism; Truth of the Bible, &c.*

Scripture Atlas, Bagster's Chronological.

Sea, On the Temperature of the, and its Influence on the Climate and Agriculture of the British Isles. By N. Whitley.

Secularist, Anti-, Lectures. By Rev. Dr. McCann.

Shinar. The Scripture Record of the Confusion of Language and the Dispersion verified by Modern Discovery. By D. McCausland, Q.C., LL.D.

Sinaitic Manuscript. See *Gospels.*

Smithsonian Institution, Washington, Report for 1868.

Society of Arts, Journal of. 2 vols.

Solar System, Primary and Present State of, particularly of our own Planet. (See also *Astronomy.*)

Soul, The Power of the, over the Body. By G. Moore, M.D.

Soul's Life, The, its Commencement, Progress, and Maturity. By Rev. E. Garbett, M.A.

Sower, Parable of the: an Exposition Explanatory and Practical. By R. Brown.

Statistical Abstract for the United Kingdom, 1854–1868.

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T.

Theosophy. Selections from the recently-published Correspondence between Louis Claude De Saint Martin and Kirchberger Baron De Liebestorf, during the years 1792-97. Edited by E. B. Penny.

Telegraph. See *Electric Telegraph.*

Thoughts on the Kingdom of God. By Rev. W. Niven, B.D.

V.

Victory over Death. By Rev. W. Niven, B.D.

W.

Weather-book, The; a Manual of Practical Meteorology. By Rear-Admiral Fitzroy.

Worlds, The Plurality of. By Rev. R. Knight.

Wrecks and Casualties reported in Lloyd's List during the year 1868.

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